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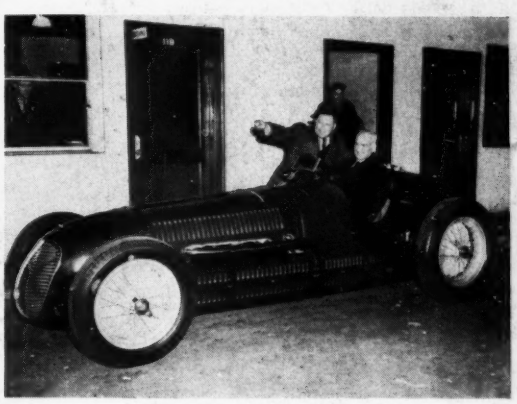
MOTOR AGE

CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

APRIL
1939

IN THIS ISSUE

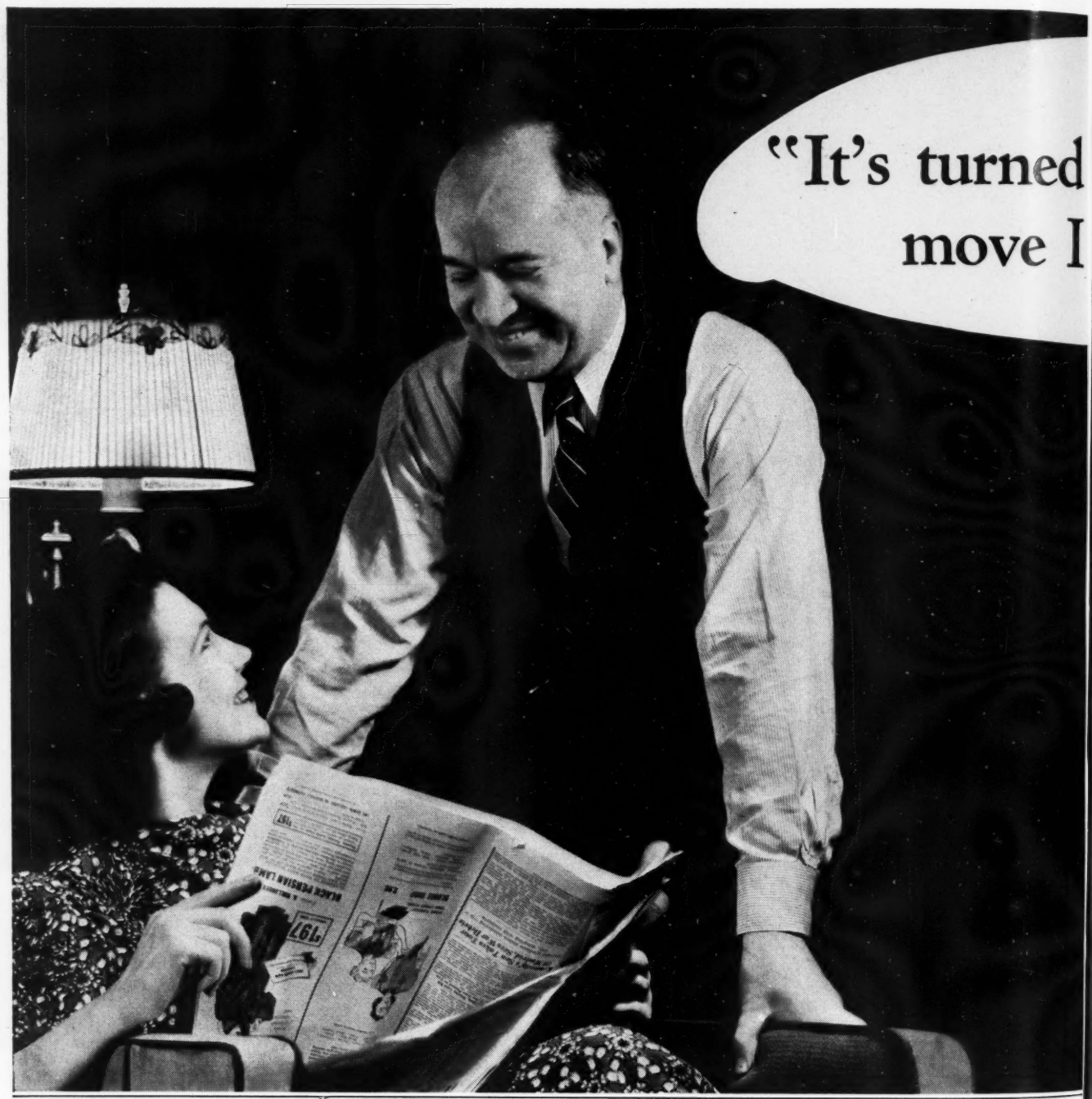


Ralph De Palma, famed racing driver, is shown seated in the new Maserati racing car which Cotton Henning, shown with him, has brought from Italy to compete in this year's Indianapolis classic. The car will be driven by Wilbur Shaw, winner of the Memorial Day speed festival in 1937. Henning says the car will do better than 185 m.p.h.

ANNUAL SPRING SERVICE AND TUNE-UP ISSUE

This issue of Motor Age is a "bible" you'll want to keep handy all year 'round. It contains complete tune-up data on all the 1939 cars as well as specifications on the older models. In addition, you'll find a completely new section this year giving specifications and tune-up data on truck models.

Other material in this issue includes a story on equipment, description of Studebaker's new entry in the low-price field and information on timing older model engines to fit the new high-octane gasolines—all together making an issue you'll want to study thoroughly.



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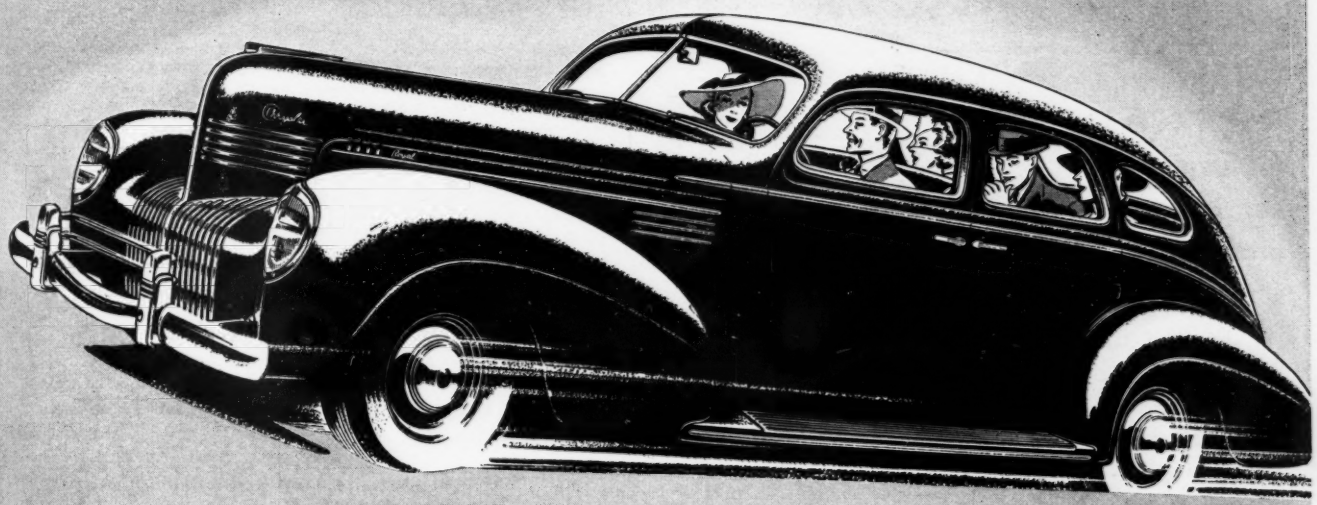

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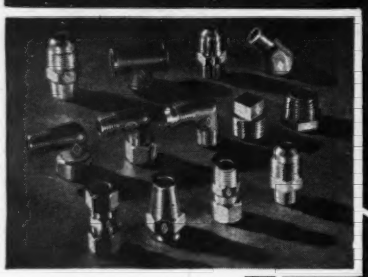

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MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

Subscriptions for Motor Age are accepted only from independent repair shops and their employees.

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In This Issue

Put Something on the Ball for Spring Tune-Up 17

Hellzapoppin in the Gasoline Field. *By Bill Toboldt* 18

Bring Equipment Up to Date for Sales Appeal. *By Al Laansma* 20

1939 Tune-Up Manual. *Compiled by A. D. Grey and H. H. Roberts* 23

Passenger Car Tune-Up Specifications. *By J. M. McAllister* 55

Truck Specifications 61

Hudson "Pacemaker Six" 63

Hail the Champion. *By Bob Hankinson* 64

News and New Products 70

Legally Speaking. *By C. R. Rosenberg, Jr.* 82

Advertisers' Index 123

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MOTOR AGE

APRIL 1939

Put Something on the Ball

for SPRING TUNE-UP

A PITCHER with only a "round-house" curve wouldn't get very far in the majors. Neither will a service station operator or mechanic get in the big league, money-making class unless he knows his stuff—and there is plenty to know.

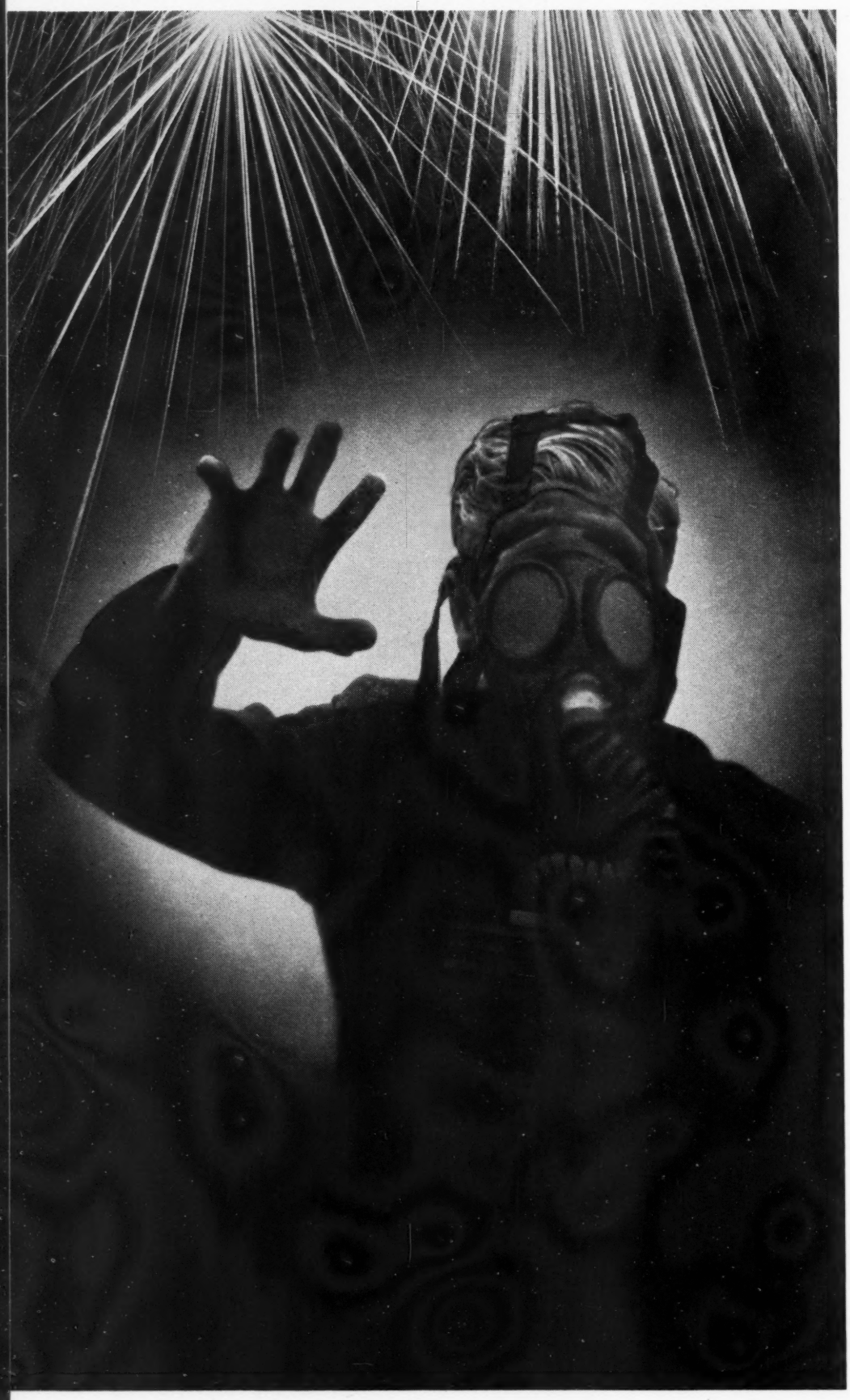
This special Spring Service and Tune-up issue of MOTOR AGE is designed to enable the repair man to put a few "hooks" on the ball whenever a customer comes up to the plate.

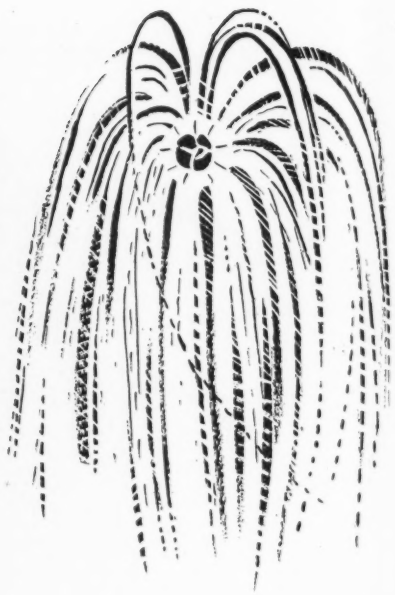
With the tune-up and service data presented in this issue, a service man will be able to tune all passenger cars from 1932 up to and including the current models. In addition, similar material is provided for trucks.

However, a service station operator must know a great deal more than the actual mechanical procedure required to repair a passenger car or truck. Of equal importance is the knowledge of how to bring in new business, how to greet customers when they do come in, what equipment to buy and where it should be placed to get the greatest return on the investment, how to sell accessories, parts and service and, in addition, he must have the ability to write direct mail and other forms of advertising. MOTOR AGE stands ready to help all of its readers. If the specific answer to any query is not found in this or other issues, write us and we will be glad to discuss your problem in detail.

Bill Tobeldt

Hellzapoppin in the





WITH the oil refiners working night and day to build new plants capable of turning out "regular" gasoline of 80 octane rating, it is only a matter of months, at the most a year, before it will be impossible to time an engine in accordance with factory timing marks. Of course, the engines will run if the timing marks are used, but the engines won't develop all the power the fuel refiners have made available in their new fuels.

It is virtually an open secret that at least one major oil company is going to market gasoline of 80 octane rating at "regular" gas price. In other words, this fuel will be equal or better in anti-knock qualities than the so-called premium fuels of today. Present-day regular fuels have an octane rating of from 70 to 72, while the premium fuels range from 77 to 80. Undoubtedly, all the major companies will have to fall in line and increase the anti-knock value of their fuels, with the result that the premium fuels will probably be increased to 85 octane and the regulars to 78 to 80 octane.

Since the factory ignition timing marks are, in general, based on fuel of 70 to 75 octane, it can readily be seen that such marks will be obsolete just as soon as these new fuels are universally available. Some stations of one major oil company are now being supplied with this new fuel and production is being rapidly increased, so that probably all

Gasoline Field

Tomorrow's "regular" fuels will have higher octane ratings than today's premium fuels. Factory timing marks will be obsolete.

By ***BILL TOBOLDT***

stations of that particular company will be dispensing the new 80 octane "regular" fuel in a few months' time.

Just how soon other major oil companies will follow suit is, of course, problematical. But, it's a safe bet they won't let any grass grow under their feet.

Spark timing can, therefore, be advanced on all passenger cars. trucks, tractors and industrial engines that use gasoline for fuel. How much to advance it can easily be determined by means of modern engine testing equipment such as the electric tachometer and dynamometers. Vacuum gages can also be used as an indication of engine speed, and pressure gages are of value in determining compression pressure.

Shops with the necessary equipment should be able to capitalize on the situation by informing their customers that to get full advantage of the new high octane fuels, their engines should be retimed and tuned.

Undoubtedly, the 1940 cars will have engines with materially higher compression ratio so as to take full advantage of these new fuels. Just how high the compression ratio will be on these new engines is impossible to state, but it is interesting to note that in 1929 the average compression ratio was 5.15, and has increased each year until, in 1938. the average compression was 6.32 to 1. The increase in compression ratio means improved performance which will tend to obsolete the present cars.

Service stations can capitalize on this situation by increasing the compression ratio of their customer's engines. It is a simple operation. All that is necessary is to plane or mill metal from the cylinder head.

Naturally, the more metal removed the higher the resulting compression ratio. However, care must be exercised not to remove too much metal from the cylinder head. Otherwise, the valves may strike the head. There is also the danger of breaking through the water jacket. In general, about 1/16 in. can be removed without getting into any difficulties—of either weakening the water jacket or from valves striking the piston.

However, in every case it is advisable to carefully examine the thickness of the casting to make sure there is sufficient material so that 1/16 in. can be removed. To check the clearance between the top of the valve in open position and the cylinder head, a piece of soft lead wire can be placed on the top of the valve. Then, with the cylinder head in place, the engine is cranked slowly by hand. The compressed thickness of the lead wire will then be equal to the clearance between valve and cylinder head.

To calculate the compression ratio, all that is necessary is to use the formula $C=\frac{A+B}{B}$

Where "*C*" equals the compression ratio, "*A*" equals the displacement of one cylinder and "*B*" equals the volume of the combustion chamber. However, the formula $B=\frac{A}{C-1}$ is also of value so as to be able to calculate the volume of the combustion chamber.

For instance, suppose you have a six-cylinder engine of 270 cu. in. and you wish to increase the compression ratio to 6 to 1. The displacement of one cylinder would $\frac{270}{6}$ or 45 cu. in. Then using the $B=\frac{A}{C-1}$

we have $B=\frac{45}{6-1}$

$B=9$ cu. in.

In other words, the volume of each combustion chamber must be decreased to 9 cu. in.

The next step is to place the cylinder head so that it is level. With the spark plug in place, pour 9 cu. in. of S.A.E. 10W oil into the combustion chamber. Then mark the level of the oil on the sides of the combustion chamber.

The face of the cylinder head must then be planed down to the mark corresponding to the height of the 9 cu. in. of oil.

Now is the time for reconditioning or replacing shop equipment. Give your shop a real check-up—let the jobber salesman help

IN getting ready for the spring tune-up and summer service seasons, nothing can pay more worthwhile returns than a careful inventory and inspection of the equipment and tools in the shop to make sure that everything is in condition to make its full contribution to increased efficiency.

It goes without saying that if such a check-up hasn't already been made, there is no time like the present to make one. The shop that shows, by the condition and appearance of its equipment, that it appreciates the importance of having everything in perfect shape, is naturally its own best advertisement to car owners that it also will pay them to have their vehicles serviced there.

A thorough check-up will give the shop operator a number of important facts about his equipment that he ought to know. He'll be in a much better position to determine exactly how his investment

Bring Equipment Up-to-Date for Sales Appeal

By AL LAANSMA

stands. He'll know which equipment meets the needs of the cars he can expect to service, which can be brought up to date or increased in capacity to continue to give satisfactory service, which ought to be replaced by something more efficient, and also what he will want to add at the first opportunity to round out the services he now is selling.

A jobber salesman representing a house in which the shop operator has confidence can be of great help in making such a check-up or in discussing the check-up after it is made. He knows first of all what is available in the latest types of equipment and can suggest what can be done to present equipment to bring it up to date. He also knows at first hand what other shops in the territory are doing.

Most jobbers carry, or can obtain on short notice, additional parts and new attachments for the equipment lines they handle that will put them back in tip-top condition. Many can recondition equipment in their machine shops. Where new equipment is needed, either at once or at some time in the future, most jobbers can arrange purchasing programs that fit the needs of the shop.

But—returning to the equipment inspection, there are a number of things to keep in mind when such a check is being made. Factors worth noting are: (1) Appearance, (2) Safety, (3) State of repair or operating condition, (4) Age, both from the standpoint of life expectancy and ability to handle late as well as older car models, (5) Adequacy or capacity, either in number of units, size or adaptability to all present-day service needs. Several of these factors overlap to some extent, but generally speaking, if each of them is kept in mind the inspection will develop information that every shop operator can use in getting the most out of his equipment investment.

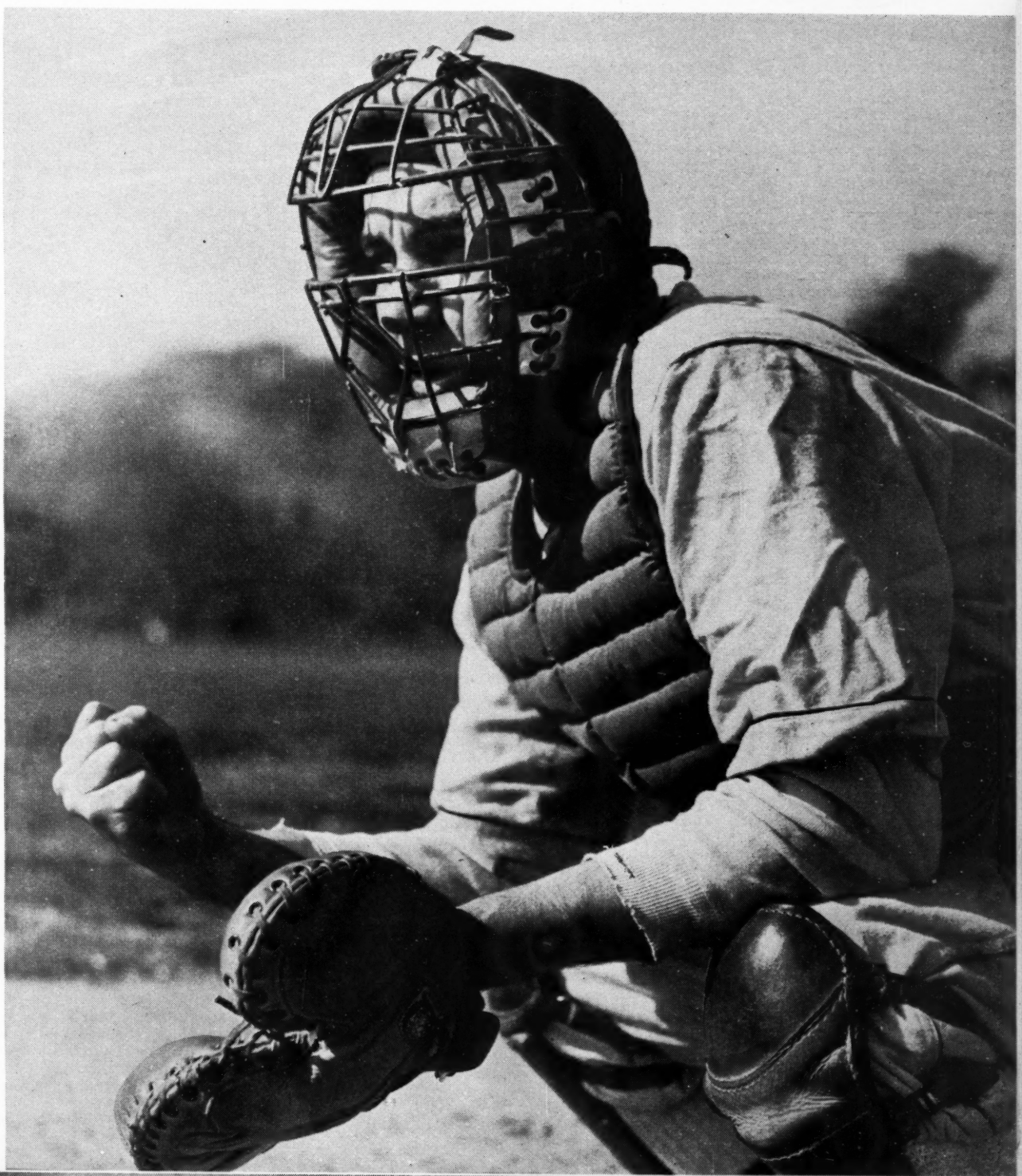
Appearance of a shop's equipment has become a tremendous factor in developing customer confidence, but it has become particularly important also as a merchandising weapon to attract business. In modern shops equipment is no longer hidden in a corner or kept out of sight. It is brightly painted, even chrome plated in spots, and is provided with backgrounds especially designed to sell service to the car owner. Equipment already in use frequently can be given increased merchandising pull by cleaning and the application of a carefully selected color scheme.

Unsafe equipment or no equipment at all, forcing employees to take unnecessary risks in doing their work, definitely impairs efficiency and encourages sloppy work. A common example is the use of wood blocks on older types of garage jacks to increase their lifting capacity to the heights required by the newer cars. Jacks without sufficient height capacity are obsolete insofar as newer cars are concerned and should be supplemented by newer jacks that meet the new requirements. Similar observations can be made about many other

(*Continued on page* 106)

"I see the Agnes M. finally wrote to Motor Age Clearing House!"

HERE ARE YOUR SIGNALS FOR *Spring Tune-Up*



COMPILED BY A. D. GREY AND H. H. ROBERTS

BUICK

SERIES 40

Engine

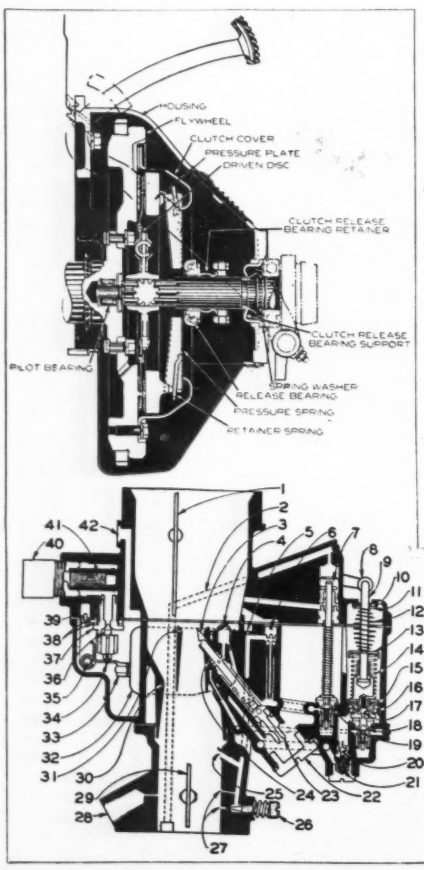
Starting engine number 3572652. Starting serial number 13388547 (Flint); 23395088 (California); and 33405088 (Linden). Eight cylinders, 3 3/2 in. bore x 4⅛ in. stroke; piston displacement 248 cu. in. Maximum brake horsepower, 107 at 3400 r.p.m. Compression ratio 6.1 to 1. Firing order 1-6-2-5-8-3-7-4.

Carburetor

Carter WDO Model 419-S. Idle adjusting screws control gas; turn out for richer mixture. Three adjustments are provided for accelerating pump. The medium setting will be found to be correct for most conditions. Correct idling speed is from 7 to 8 m.p.h.

Distributor

Delco-Remy Model No. 1110801, full automatic advance type. Centrifugal advance 10 to 14 deg. on flywheel at 800 r.p.m., 22 to 26 deg. on flywheel at 3000 r.p.m. Total vacuum advance 10 to 12 deg. on flywheel. Vacuum advance starts at 5 to 7 in. (mercury). Total vacuum advance at 10 to 13 in. (mercury). Cam contact angle, 31 deg. Breaker point gap, .015 in.



Ignition Timing

Spark occurs 4 deg. before top dead center.

Spark Plugs

Standard equipment is AC 46, 14 mm. Set gap to .025 in.

Valves

Seat angle of inlet and exhaust valves, 45 deg. Operating tappet clearance, .015 in.

Valve Timing

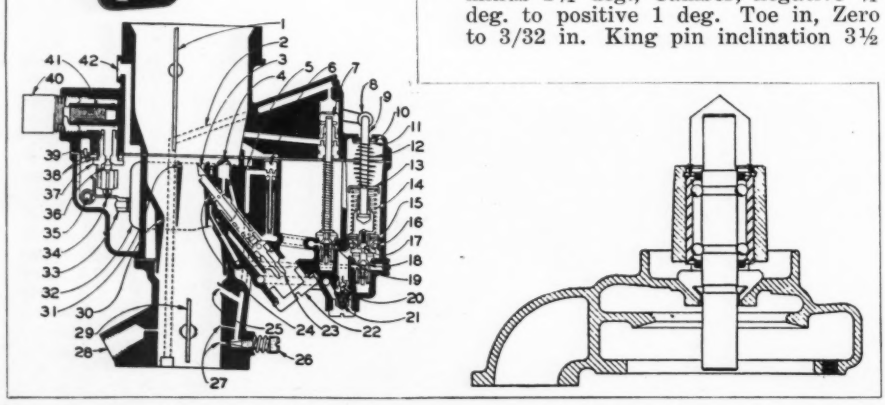
With tappets set to .015 in. inlet valve should be .004 in. off its seat at 13 deg. before top center. Marks on cam and crankshaft sprockets should align with copper plated washers on chain. There should be 11 pins of the timing chain between the marks, counting the pins at each end.

Steering Gear

Saginaw worm and double roller. To adjust steering gear, proceed as follows: 1. Tighten drop arm nut. 2. Disconnect steering tie rod. Check for stiffness or binding and if necessary loosen gear in frame bracket and shim to correct alignment. 3. Remove roller shaft end play by tightening screws that hold side cover to housing, loosening jam nut, turning adjusting screw tight (by hand) and backing it off about 10 deg. and then tightening lock nut. Check to see that adjustment has not caused binding. 4. Remove worm shaft end play by loosening jam nut, tightening adjusting screw until slight drag is felt at steering wheel and tightening jam nut. 5. Remove back lash between worm and roller tooth with the steering in the straight ahead position, by loosening lash adjuster lock screw, tapping adjuster in direction of arrow, and then tightening lock screw.

Front End Suspension

Caster angle, minus ½ deg. to minus 1¼ deg., Camber, negative ¼ deg. to positive 1 deg. Toe in, Zero to 3/32 in. King pin inclination 3½ deg. to 4½ deg. Camber is non-adjustable except by installation of special upper control arm pivot. Adjust toe-in by turning adjusting sleeve at outer end of each tie rod. Caster is adjusted by turning threaded pin in shock absorber arm, after loosening clamping bolt and removing lubrication fitting.



Voltage Control Unit

Delco-Remy Model 5858. Relay points should close between 6.4 and 7.0 volts (cold). Voltage regulator should operate at 7.4 to 7.6 volts.

Connecting Rods

Rods have spun-in babbitt bearings and are equipped with shims. Bearing clearance should be .0008 in. to .00018 in. End play should be .005 in. to .010 in.

Main Bearings

Steel-backed babbitt, renewable from below and interchangeable in complete sets. Bearing clearance should be .0007 in. to .0022 in. Center main bearing should have .004 in. to .008 in. end play.

Battery

Delco-Remy Model 17E1-W. Capacity 110 ampere hours. Negative terminal is grounded.

Generator

Delco-Remy Model No. 1101052. Field amperes at 6 volts, 2.0 to 2.3. Maximum output 31 amperes (cold), or 28 amperes (hot). Motoring current at 6 volts, 4.5 to 7.0 amperes.

Starter

Delco-Remy Model 1107005. Free speed 5000 r.p.m. at 5 volts. Lock torque 12 ft. lbs. at 575 amperes, 3.4 volts. Running torque 8 ft. lbs. at 375 amperes, 4.1 volts.

Starter Switch

Starter is operated by hand throttle control or by accelerator pedal. Switch is mounted on front of automatic choke and operated by engine vacuum and linkage connected with throttle shaft. Solenoid on starting motor operates pinion shifting mechanism and closes starter switch.

Brakes

Own hydraulic with 12 in. drums. Lining per wheel 22 11/16 in. x 1¾ in. x 3/16 in. Hand brake lever operates on rear service shoes. Percent of braking power on rear wheels, 47.

BUICK

SERIES 60, 80, 90

Engine

Starting engine No. 3572652. Starting serial numbers 13388547 (Flint), 23395088 (California), and 33405088 (Linden). Eight cylinders, 3 7/16 in. bore by 4 5/16 in. stroke, piston displacement 320.2 cu. in. Maximum brake horsepower 141 at 3600 r.p.m. Compression ratio 6.25 to 1. Firing order: 1-6-2-5-8-3-7-4.

Carburetor

Stromberg AAV-26. Idle adjusting screws control gas; turn out for richer mixture. Normal adjustment of idle screws, 1¼ turn off seat. Correct idling speed, 7 to 8 miles per hour.

Distributor

Delco-Remy Model 1110805, full automatic advance type. Centrifugal advance, 10 to 14 deg. (flywheel) at 800 r.p.m., 22 to 26 deg. (flywheel) at 3000 r.p.m. Total vacuum advance, 10 to 12 deg. on flywheel. Vacuum advance starts at 5 to 7 in. (mercury). Total vacuum advance at 10 to 13 in. (mercury). Cam contact angle 31 deg. Breaker point gap .015 in.

Ignition Timing

Spark occurs 6 deg. before top dead center.

Spark Plugs

Standard equipment is AC 46, 14 mm. Set to 0.25 in.

Valve Timing

With tappets set to .015 in. inlet valve should be .004 in. off its seat at 14 deg. before top center. Marks on cam and crankshaft sprockets should aline with copper plated washers on chain. There should be 11 pins of the timing chain between the marks, counting the pins at each end.

Steering Gear

Saginaw worm and roller. Steering is adjusted the same as on Series 39-40 except that on the Series 39-80 and 39-90 the connecting rod is disconnected instead of the tie rod.

Front End Suspension

Caster angle minus ½ deg. to minus 1¼ deg. Camber, negative ¼ deg. to positive 1 deg. Toe in Zero to 3/32 in. King pin inclination—Series 39-60, 3½ deg. to 4½ deg.; Series 39-80, 4¼ deg. to 5¼ deg.; Series 39-90, 4 deg. to 5 deg. Camber is non-adjustable except on the 39-60 on which camber can be adjusted by the installation of a special upper control arm pivot. Adjust toe-in on the 39-60 by turning adjusting sleeve at outer end of each tie rod. Toe-in is adjustable on the Series 39-80 and 39-90 by turning the tie rod tubes after loosening the clamp bolts at each end. Caster is adjusted on the Series 39-60 in the same manner as on the 39-40. The Series 39-80 and 39-90 are provided with adjusting screws near the upper end of the steering knuckle support. These screws may be turned to change the caster after loosening the nuts on upper adjuster bolt.

Voltage Control Unit

Delco-Remy Model 5858. Relay points should close between 6.4 and 7.0 volts (cold). Voltage regulator should operate at 7.4 to 7.6 volts.

Connecting Rods

Rods have spun-in babitt bearings and are equipped with shims. Bearing clearance should be .0008 in. to .0018 in. End play should be .005 in. to .010 in.

Main Bearings

Steel backed babitt, renewable from below and interchangeable in complete sets. Bearing clearance should be .007 in. to .0022 in. Center main bearing should have .004 in. to .008 in. end play

Battery

Delco-Remy Model 17E1-W. Capacity 110 amp. hr. Negative terminal grounded.

Generator

Delco-Remy Model No. 1101053 on series 39-60; Series 39-80 and 39-90 use Delco-Remy Model No. 1101055. Maximum output, 31 amp. cold or 28 amp. hot. Motoring current at 6 volts, 4.5 to 7 amp. Field amp. at 6 volts, 2.0 to 2.3.

Starter Switch

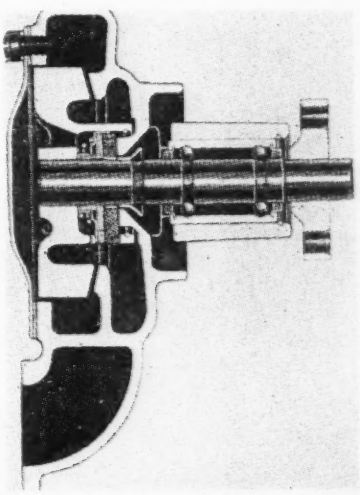
Starter is operated by hand throttle control or by accelerator pedal. Switch is mounted on front of automatic choke and operated by engine vacuum and linkage connected with throttle shaft. Solenoid on starting motor operates pinion shifting mechanism and closes starter switch.

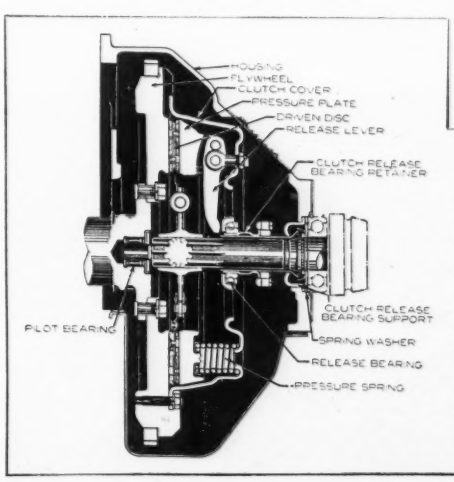
Starting Motor

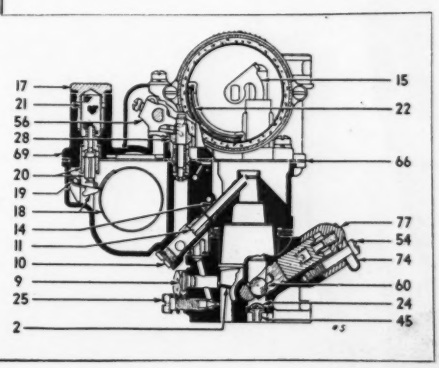
Delco-Remy Model No. 1107908. Free speed 5000 r.p.m. Lock torque 16 ft. lb. at 600 amp., 3 volts. Free speed amperage, 65 at 5000 r.p.m.

Brakes

Own hydraulic. Major adjustment: Jack up wheels and disconnect hand brake cables. Loosen anchor bolt and expand shoes by turning the star wheel, which is located directly opposite to the anchor bolt until anchor bolt centralizes itself. A light tap with a hammer may be necessary to assist movement of anchor bolt. With shoes still expanded, adjust hand brake cables so that clevice pins will just enter clevices. Tighten anchor bolt with a 16-in. wrench. Back off star wheel adjustment until wheels are free of drag. Loosen eccentric lock nut and turn eccentric until a .010-in. feeler is just gripped between lining and drum at the primary shoe. Tighten eccentric lock nut. Turn star wheel adjuster until a .010-in. feeler is just gripped between the lining and drum at secondary shoe. Test card on road and back off adjuster at tight wheel. A minor adjustment consists of the above except anchor adjustment.







CADILLAC

SERIES 60S. 61. 75

Engine

Starting serial numbers—8200001 on Series 39-61 and 3290001 on Series 39-75. Vee type engine, eight cylinders, 3½ in. x 4½ in. Piston displacement 346 cu. in. Standard compression ratio 6.25 to 1 (39-61) and 6.7 to 1 (39-75). Firing order 1L-4R-4L-2L-3R-3L-2R-1R. Maximum brake horsepower 135 at 3400 r.p.m. (39-61) and 140 at 3400 r.p.m. (39-75). Cylinder head nuts should be tightened to 70-75 ft. lbs. of torque.

Battery

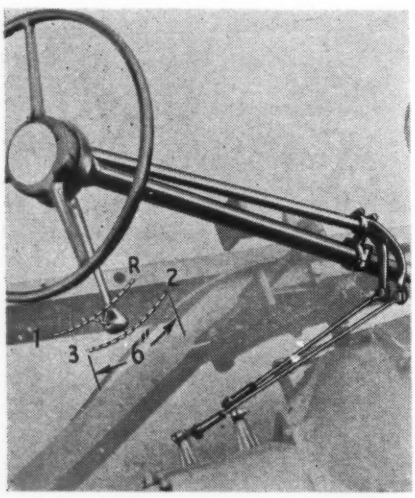
Delco Model 17K1W. Capacity 112 ampere hours. Positive terminal grounded.

Generator

Delco-Remy Model DR 1101056 (39-61), Model DR 1102654 (39-75) peak load type. Maximum charging rate 28-30 amperes.

Valve Timing

With zero tappet clearance, inlet valves open at top dead center and exhaust valves close at 10 deg. after top dead center.



Starter

Delco-Remy Model 727V. No load test, 5500 r.p.m., 65 amperes at 5 volts.

Starter Switch

Delco-Remy push button operating solenoid shifted gear.

Pistons

Aluminum alloy with T slot, anodized finish. Clearance at skirt .0021 in.

Connecting Rods

Bearings are removable steel backed babbitt. Rod and piston assemblies are removable from above. Connecting rod bolts should be tightened to 55-60 ft. lbs. of torque.

Main Bearings

Main bearings are bronze or steel backed babbitt. Clearance .0015 in. Crankshaft end play .001 in. to .005 in. End play is controlled by center main bearing. Main bearing cap screws should be tightened to 130-140 ft. lbs. of torque.

Distributor

Delco-Remy No. 1110604. Maximum automatic advance 22 deg. Manual advance 20 deg. Breaker point gap .0125 in. to .0175 in.

Ignition Timing

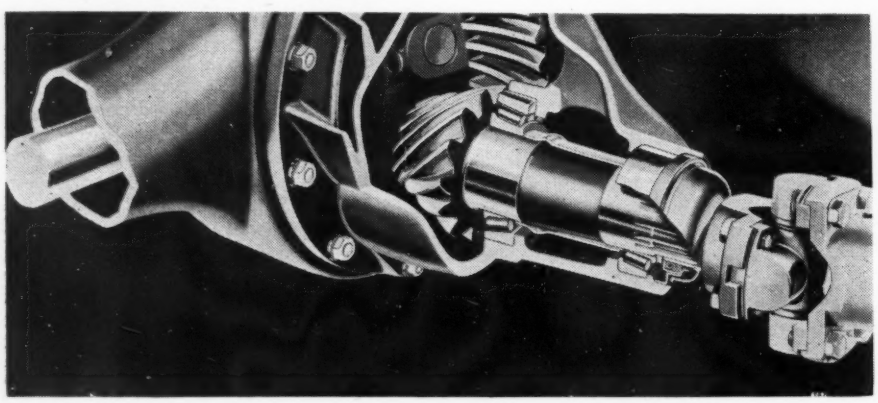
Breaker points should open 5 deg. before top center.

Spark Plugs

Standard equipment is AC 104. Gap should be set to .025 in. to .030 in.

Valves

Operating tappet clearance automatically adjusted by hydraulic lifters.



Front Suspension

Caster negative ¼ deg. to 2¼ deg. (39-61), negative ¼ deg. to 1¼ deg. (60 special), zero to ¼ deg. (39-75). Camber zero to ¾ deg. (39-61), negative ¼ deg. to plus ½ deg. (60 special) and zero to ½ deg. (39-75). Toe-in 1/32 in. to 3/32 in.

Steering Gear

Saginaw worm and double roller.

To adjust, back off worm adjustment lock nut and adjusting screw, also back off roller adjustment lock nut. Turn adjusting screw in against roller shaft until all play is taken up and a slight binding is felt when turning steering wheel with roller off high spot. Back off adjusting screw until adjustment is free and tighten lock nut.

Turn steering wheel 1½ to 2 turns from straight ahead position and adjust screw at bottom of housing until a pull of about 1 lb. at rim of steering wheel is necessary to move wheel around. Tighten worm adjustment lock nut. Loosen eccentric adjustment lock screw and turn quadrant on eccentric sleeve to adjust back lash between worm and roller.

Tighten locking screw and recheck adjustment.

Brakes

Bendix hydraulic with 12 in. drums on models 39-61 and 60 special, 14 in. drums on 39-75 models. Lining per front wheel, 24½ in. x 2 in. x 3/16 in. (39-61), 24½ in. x 2¼ in. x 3/16 in. (60 special) and 28 11/16 in. x 2¼ in. x ¼ in. (39-75). Lining per wheel 24½ in. x 2 in. x 3/16 in. (39-60 and 60 special) and 28 11/16 x 2¼ in. x ¼ in. (39-75).

Major adjustment: Jack up wheels and disconnect hand brake cables. Loosen anchor bolt and expand shoes by turning the star wheel, (which is located directly opposite to the anchor bolt) until anchor bolt centralizes itself. A light tap with a hammer may be necessary to assist movement of anchor bolt. With shoes still expanded, adjust hand brake cables so that clevice pins will just enter clevices. Tighten anchor bolt with a 16 in. wrench. Back off star wheel adjustment until wheels are free of drag.

Loosen eccentric lock nut and turn eccentric until a .010 in. feeler is just gripped between lining and drum at the primary shoe. Tighten eccentric lock nut. Turn star wheel adjuster until a .010 in. feeler is just gripped between the lining and drum at secondary shoe. Test car on road and back off adjuster at tight wheel. A minor adjustment consists of the above except anchor adjustment.

CHEVROLET

MASTER & MASTER DE LUXE

Engine

Own make with overhead valves. 3½ in. bore x 3¾ in. stroke. Piston displacement 216.5 cu. in. Compression ratio 6.25 to 1. Max. brake horsepower 85 at 3200 r.p.m. Max. torque 170 ft. lbs. at 900 to 2000 r.p.m. Firing order 1-5-3-6-2-4.

Distributor

Delco-Remy model 1,110,008. Single breaker point type with Octane selector. Max. automatic advance 50 deg. Vacuum advance 17 deg. at flywheel. Breaker point gap .018 to .024 in.

Ignition Timing

With Octane selector set to zero and breaker points set to .021 in. spark occurs 5 deg. before top center or when the steel ball in flywheel face aligns with pointer on right hand side of flywheel housing. For maximum performance, set timing so that a slight ping is heard when accelerating under full throttle.

Valves

Set angle of valves 30 deg. Operating tappet clearance inlet .006 in. exhaust .013 in. same clearance for valve timing.

Valve Springs

Spring pressure 53 to 59 lbs. at 1 13/16 in. 126 to 134 lbs. at 1½ in. Free length 2 7/32 in. cup and cone keeper used.

Valve Timing

With inlet tappets set to .006 in. and exhaust tappets set to .013 in. inlet valve opens 9 degrees before top center or 1½ flywheel teeth before the steel ball in flywheel face (this is 3½ flywheel teeth before top center) aligns with pointer. Marks on cam and crankshaft gears should be nearest each other and in line between shaft centers.

Connecting Rods

Lower bearing is centrifugally cast babbitt. Clearance .001 to .0025 in. End play .0065 to .0135 in. Rod and piston assemblies may be removed from above. Numbers stamped on rod and rod cap are to be turned to camshaft side of engine.

Main Bearings

Mains are steel backed babbitt. To renew main bearings it is necessary to remove engine and align bore. (Clutch housing should not be removed from the engine block as the transmission pilot hole, in the clutch housing, is used in the alignment of the boring bar.)

Pistons

Own make tin plated cast iron with split skirt. Clearance at top .0145 in., at skirt .0015 to .003 in. Weight 25.5 oz. Length 4 11/64 in. Depth of ring grooves—Oil .173 to .183 in. Compression .150 to .162 in. Width of rings—Oil .1860 to .1865 in. Compression .1235 to .1240 in. Ring gap—Oil .005 to .015 in. Compression .005 to .015 in. Wrist pin: Length 3.135-3.165 in. Diameter .8645 to .8650 in. Wrist pin is locked in rod. Rod and piston assemblies may be removed from above.

Carburetor

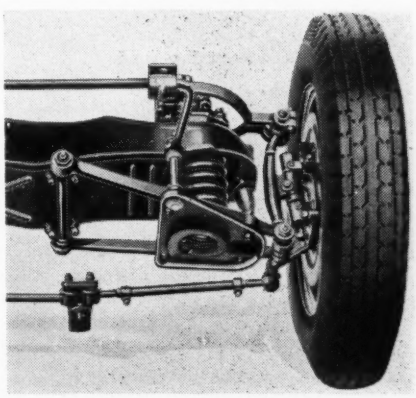
Carter W1 single downdraft. Idle adjusting screw controls gas, turn out for richer mixture. Standard setting is ½ to 1 turn open. Set idle speed to approx. 400 r.p.m. The accelerating pump arm is provided with three holes, use hole on longest radius to secure greatest accelerating charge. Float height: Distance from top of float to float cover should be ½ in. with float in raised position. Metering rod: Replace metering rod with metering rod gage. With gage in position, accelerating pump arm pin (which carries metering rod) should just rest in notch in gage when throttle is completely closed.

Generator

Delco-Remy model 1,100,004 fixed third brush type with voltage regulator. Max. charging rate—Hot 25 to 28 amps. at 8.0 volts 3600 r.p.m.: Cold 26 to 30 amps. 8.0 volts 3400 r.p.m. Cut out relay closes at 6.5 to 7 volts, opens at zero to 3 amps discharge. Voltage regulator is set to 7.45 to 7.55 hot.

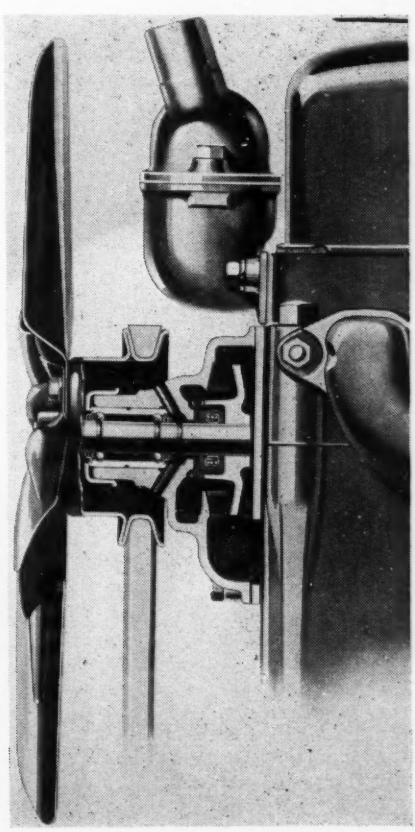
Starter

Delco-Remy model 1,107,009 with overrunning clutch. Lock test 525 amps., 3.4 volts, 12 ft. lbs. torque. No load test 125 amps., 5.4 volts, 2500 r.p.m. Ratio between starter pinion and flywheel 15.44 to 1. There are 139 teeth in flywheel.



Steering Gear

Saginaw worm and roller tooth. Before adjusting steering gear it is necessary to check the gear alignment on the Model 85 as follows: Tighten mast jacket at dash clamp, then loosen gear at frame. Now, with a feeler gage, check the clearance at both sides of the gear housing (to frame). If clearance, at either side, exceeds .031 in. insert shims under bracket to take up this excessive clearance. To remove end play from worm bearings, tighten large nut at bottom of mast jacket. (Tighten enough to remove play only.) End play in cross shaft is removed at the adjusting screw in the side of the housing. (Top of housing on Master DeLuxe models.) To remove backlash between worm and roller: Set steering wheel in mid-position. Loosen the three housing to cover bolts and the eccentric locknut. With one wrench on the eccentric bolt, another on the eccentric sleeve, turn both wrenches in opposite directions in very slow stages, noting results at each stage, by moving the pitman arm. Turn bolt and sleeve (in opposite directions) just enough to remove backlash AND NO MORE. Tighten housing to cover bolts.



CHRYSLER

ROYAL C-22

Engine

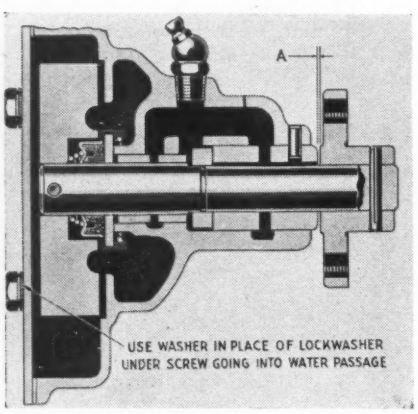
Own six cylinder L head. 3⅜-in. bore x 4½-in. stroke. Piston displacement 241.5 cu. in. Maximum brake horsepower Std. 100 at 3600 r.p.m. Opt. head 107 at 3600 r.p.m. Compression ratio Standard cast iron head 6.5 to 1. Optional aluminum head 7.0 to 1. Torque recommended to tighten cylinder head. Nuts 50 to 55 ft. lb. Cap screws 60 to 65 ft. lb.

Distributor

Auto-Lite single breaker point model with vacuum retard. Breaker point gap .020 in. Breaker arm spring tension 18 to 20 oz.

Ignition Timing

With breaker points set to .020 in. spark occurs at top center (cast iron head) or when the top center mark on vibration damper aligns with pointer. Factory recommends that timing be set (cast iron or aluminum head) within a range of 4 deg. before top center to 4 deg. after top center so that a slight ping is audible when accelerating with wide open throttle from 10 m.p.h. in high gear.



Valves

Seat angle of valves 45 deg. Operating tappet clearance inlet .008 in. exhaust .010 in. hot. Hardened inserts are used for exhaust valve seats. Tappet clearance for valve timing .014 in.

Valve Springs

Spring pressure 101 to 109 lb. at 1 13/32 in.; 40 to 45 lb. at 1¾ in.

Valve Timing

With tappets set to .014 in. inlet valve opens 8 degrees before top center or when the 8 degree mark on vibration damper aligns with pointer. Exhaust closes 2 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Pistons are cam ground aluminum alloy, anodice surfaced with U slot. Length 2⅞ in. Clearance at top .022 in. at skirt .0000 to .0010 in. (cam ground). Piston ring groove depth—Oilrings .177 in. Compression rings .157 in. Width of rings—Oil 5/32 in. Compression ⅛ in. Rod and piston assemblies may be removed from above.

Main Bearings

Bearings are steel backed babbitt removable precision inserts. Mains may be renewed from below (to remove front main bearing cap it is necessary to remove timing case cover and screw in oil plate which threads into the cap).

Generator

Auto-Lite shunt type with voltage regulator. Maximum charging rate hot 28 amps. at 8 volts 2500 r.p.m. Cold 28 amps. at 8 volts 2000 r.p.m. Cutout relay closes at 6.4 volts, opens at zero to 3 amps. reverse current. Voltage regulator is set to 7.4 to 7.7 volts cold, 7.1 to 7.4 volts hot.

Transmission Control

Adjust gear shift control rod as follows: 1. Remove control rod from shifter lever at transmission. 2. Set transmission in neutral and set shift lever in the neutral position. 3. Move transmission lever about ⅛ in. towards rear of car to take out backlash in slide rails. 4. With transmission lever held in this position, adjust control rod so that it freely enters hole in lever. Adjust gear selector cable as follows: 1. Loosen clamp which holds cable at the steering column end. 2. Set gear shift lever in the neutral position. 3. Turn sleeve screw, at bottom of steering column, until a slight play is felt in the cable. Now turn sleeve, in the opposite direction, just enough to remove play.

Spark Plugs

Auto-Lite A-7. Set gap to .025 in.

Connecting Rods

Lower bearings are steel backed babbitt removable precision inserts. Clearance .0005 to .0025 in. End play .0055 to .0115 in. Rod and piston assemblies may be removed from above.

Steering Gear

Gemmer worm and double roller with external mesh adjustment. End play in worm is controlled by shims under the housing lower cover plate. Removing shims will decrease end play. Mesh of gear is controlled by the adjusting screw in the housing side cover plate. Remove acorn nut and turn adjusting screw until all backlash in gear is removed. Care should be exercised so as not to bind the gear on its "high spot."

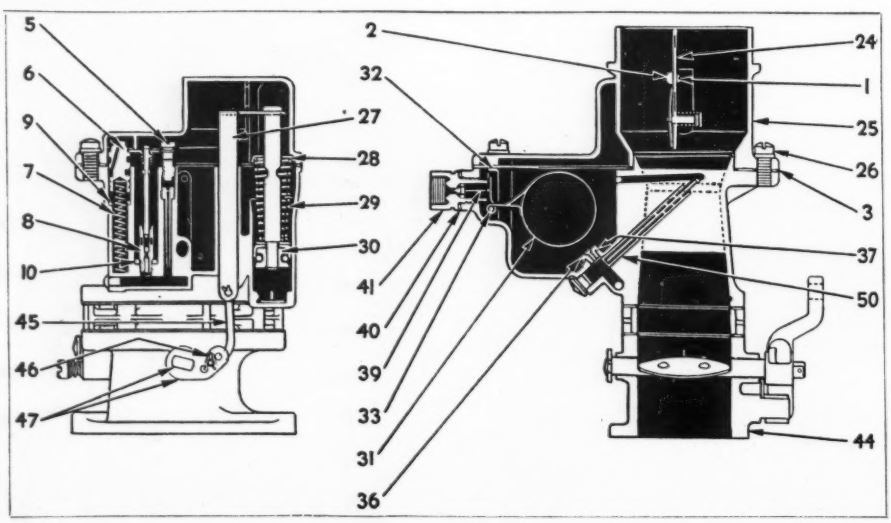
Battery

Willard 15 plate. Capacity 119 amp. hr. at 20 hr. rate.

Transmission Disassembly

(Cars without overdrive)

1—Remove transmission from car. 2—Remove the gear shifter retainer screws and lift out the fork and rail assemblies. 3—Remove the universal joint flange. 4—Remove brake assembly and brake support casting. 5—Pull mainshaft out rear of case. 6—Remove countershaft lock plate from rear of case. 7—Drive countershaft out through rear of case letting gear cluster fall to bottom of case. 8—Remove main drive pinion cove and main drive pinion from front of case. 9—Lift out countershaft gear cluster. 10—Push idler shaft out through rear of case and lift out idler gear. 11—Remove snap ring from front part of mainshaft and pull the hub out of the sliding clutch. Reassemble in reverse order.



CHRYSLER

IMPERIAL C-23. CUSTOM IMPERIAL C-24

Engine

Own L head eight cylinder. 3¼ in. bore x 4⅞ in. stroke, piston displacement 323.5 cu. in. Maximum brake horsepower 130 at 3400 r.p.m. with standard head; 138 at 3400 r.p.m. with high compression head. Compression ratio 6.8 to 1 with standard head; 7.45 to 1 with high compression head. Compression pressures 150 to 160 lbs. at 1000 r.p.m. with standard head; 160 to 170 lbs. at 1000 r.p.m. with high compression head. Torque recommended to tighten cylinder head nuts 50 to 55 ft. lbs. cap screws 60 to 65 ft. lbs.

Distributor

Auto-Lite single breaker point type with vacuum control. Breaker point gap .018 in. Breaker arm spring tension 18 to 20 oz. Vacuum required to start vacuum advance mechanism 5 in. (at diaphragm). Firing order 1-6-2-5-8-3-7-4.

Ignition Timing

With breaker points set to .018 in. and distributor hold down plate set to zero, spark occurs at top center or when the zero mark on vibration damper aligns with pointer. Factory recommends that timing be set, within a range of 4 deg. before top center to 4 deg. after top center, so that a slight ping is audible when accelerating with wide open throttle from 10 m.p.h. in high gear.

Valves

Seat angle of valves 45 deg. Alloy insert exhaust valve seats used. Operating tappet clearance—inlet .008 in. exhaust .010 in. hot. Clearance for valve timing—inlet .011 in. exhaust .014 in.

Valve Springs

Spring pressure 122 to 130 lbs. at 1 21/32 in. 52 to 58 lbs. at 2 1/32 in.

Valve Timing

With inlet tappets set to .011 in. and exhaust tappets set to .014 in. inlet opens 6 deg. before top center or when the 6 degree mark on vibration damper aligns with pointer. Exhaust closes 12 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Cam ground aluminum alloy with T slot. Clearance at top .021 in. at skirt .0000 to .0010 in. Ring groove depth—Oil .177 in. Compression .157 in. Ring width—Oil rings 5/32 in. Compression rings ⅛ in. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are steel backed removable precision inserts. Mains may be removed from below. (Remove timing case cover and screw between timing case oil plate and front main bearing cap in order to remove front main bearing.) Main bearings are furnished .0015 in. and .010 in. undersize as well as standard.

Generator

Auto-Lite shunt type generator with voltage regulator. Maximum charging rate hot 28 amps, at 8.0 volts, 2500 r.p.m. Cold 28 amps, at 8.0 volts, 2000 r.p.m. Cut out relay closes at 6.4 volts. Voltage regulator is set to 7.4 to 7.7 volts cold, 7.1 to 7.4 volts hot.

Steering Gear

Gemmer worm and double roller type with thrust button adjusted gear mesh. End play in worm is adjusted by means of shims under the housing lower cover plate. Removing shims at this point will decrease end play in worm. Mesh of gear is controlled by the thrust button in the housing side cover plate. Remove acorn nut and turn adjusting screw until backlash of gear is removed. Replace acorn nut.

Spark Plugs

Auto-Lite A-7 with gap set to .025 in.

Fluid Drive (Model C-24)

Loss of fluid from the drive will be evidenced by excessive engine speeds (similar to slipping clutch). To replace fluid, proceed as follows: Remove the screw holding the screen in the inspection hole on the right side of the clutch housing. Rotate the fluid drive unit until the filler plug in the fluid drive unit is opposite the inspection hole. Remove the filler plug and fill the unit with fluid drive oil until fluid just spills out. Replace filler plug and tighten securely. (It is recommended that a new gasket be used any time the filler plug is disturbed.) Replace screen.

Connecting Rods

Lower bearing is a steel backed, removable, precision insert. Clearance .001 to .003 in. End play .006 to .011 in. Rod and piston assemblies may be removed from above.

Starter

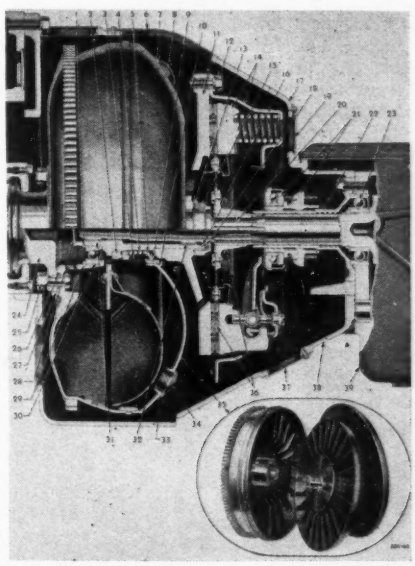
Auto-Lite with overrunning clutch. Starter pinion meshes from front.

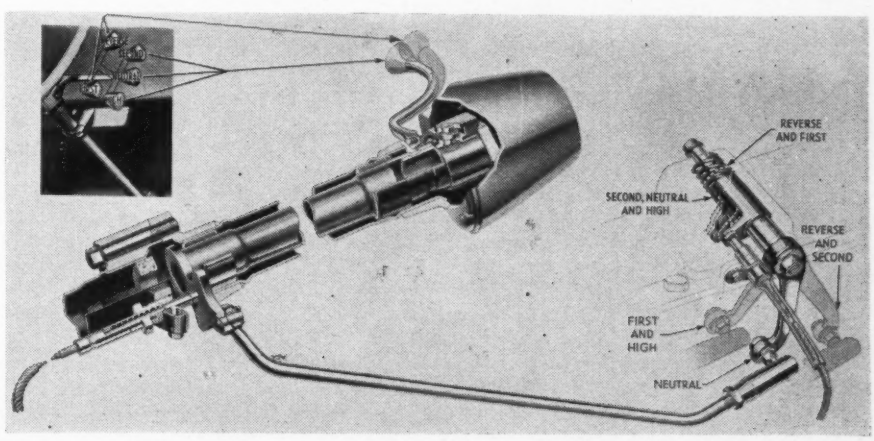
Starter Switch

Solenoid type, operated by a push button switch on dash.

Battery

WILLARD 17 plate. Capacity 126 ampere hours at 20 hour rate.





DE SOTO

MODEL S-6

Engine

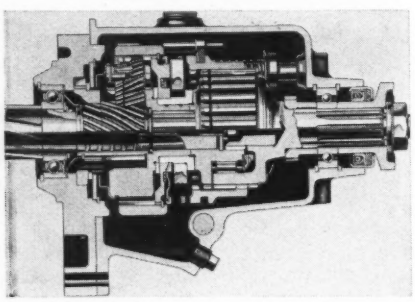
Own six cylinder L head. 3⅜-in. bore by 4¼-in. stroke, piston displacement 228.1 cu. in. Maximum brake horsepower 93 at 3600 r.p.m. with standard head; 100 at 3600 r.p.m. with high compression head. Compression ratio 6.5 to 1 with standard head; 7.0 to 1 with high compression head. Compression pressures 140 to 150 lb. at 1000 r.p.m. with standard head; 150 to 160 lb. with high compression head. Firing order 1-5-3-6-2-4. Torque recommended to tighten cylinder headnuts 50 to 55 ft. lb. Cap screws 60 to 65 ft. lb.

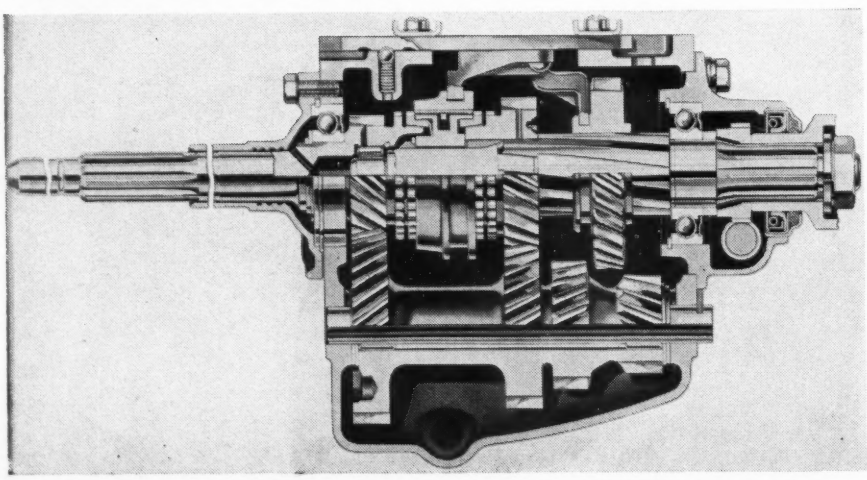
Distributor

Auto-Lite single breaker point type with vacuum control. Breaker point gap .020 in. Breaker arm spring tension 18 to 20 oz. Vacuum required to start advance mechanism 5 in. (at diaphragm).

Ignition Timing

With breaker points set to .020 in. and distributor indicator set to zero, spark occurs at top center or when the zero mark on the vibration damper alines with pointer. Factory recommends that ignition timing be set within a range of 6 deg. before top center to 2 deg. after top center, so that a slight ping is audible when accelerating with wide open throttle from 10 m.p.h. in high gear.





Valves

Operating tappet clearance inlet .008 in., exhaust .010 in. Clearance for valve timing inlet and exhaust .014 in. Seat angle of valves 45 deg.

Valve Springs

Spring pressure 101 to 109 lb. at 1 13/32 in. 40 to 45 lb. at 1¾ in.

Valve Timing

With tappets set to .014 in. inlet valve opens 8 deg. before top center or when the 8 deg. mark on vibration damper alines with pointer on timing case cover. Exhaust closes 2 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons and Rings

Cam ground aluminum alloy with T slot. Clearance at top .022 in. At skirt .0000 to .0010 in. at maximum diameter. Ring groove depth—Oil .177 in. Compression .157 in. Width of rings—Oil 5/32 in. Compression ⅛ in. Piston pin is full floating. Rod and piston assemblies may be removed from above.

Main Bearings

Main bearings are steel backed babbitt, removable, precision insert which may be renewed from below. (No. 1 main requires the removal of the timing case cover and the screw which threads through the timing case oil plate and the front main bearing cap. This will permit the removal of the front cap.) Bearing clearance .001 to .002 in. Crankshaft end play .003 to .007 in.

Carburetor

Carter model E6N1 single down draft type. Float height: Distance from top of float (not soldered seam) to machined surface of float chamber should be 5/64 in. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Standard setting is ½ to 1¼ turns open. Do not idle engine below 300 r.p.m (6 m.p.h.). Accelerating pump: Delayed action type. Accelerating pump arm has three holes, set link in hole on longest radius (outer hole) in cold weather or to secure greatest accelerating charge. With link set in center hole, pump plunger should move 21/64 in. from closed to wide open throttle.

Generator

Auto-Lite with voltage regulator. Maximum charging rate 28 amp. at 8.0 volts 2000 r.p.m. cold; 28 amp. at 8.0 volts 2500 r.p.m. hot. Cutout relay closes at 6.4 volts, opens at zero to 2½ amp. reverse current. Voltage regulator is set to 7.4 to 7.7 volts cold; 7.1 to 7.4 volts hot.

Steering Gear

Gemmer double roller integral housing type with external mesh adjustment. End play in worm is adjusted by means of shims under the housing lower cover plate. Removing shims decreases end play. Mesh of gear is controlled by the thrust button in the housing side cover plate. Remove acorn nut and turn adjusting screw until backlash of gear is removed. Replace acorn nut.

Transmission Control

To adjust gear shift control rod—Remove control rod from shift lever at transmission. Set transmission in neutral and move shift lever to the neutral position. Move transmission lever about ⅛ in. toward rear of car to take out play in shift rails and forks. Now adjust control rod so that it freely enters transmission shift lever. To adjust gear selector cable, loosen clamp screw which holds cable at the steering column end. Move gear shift lever to the neutral position. Turn cable sleeve screw until a slight play is felt in cable. Now turn sleeve screw in the opposite direction until this play is just removed. Tighten clamp screw.

Spark Plugs

Auto-Lite A7 with gap set to .025 in.

Connecting Rods

Lower bearing is a steel backed babbitt, removable precision insert. Clearance .0005 to .0025 in. End play .0055 to .0115 in. Undersize bearing inserts are available. Rod and piston assemblies may be removed from above.

Battery

Willard 15 plate. Capacity 115 amp. hr. at 20 hr. rate.

DODGE

MODEL D-11

Engine

Own 6 cylinder L head. 3¼-in. bore x 4⅜-in. stroke, piston displacement 217.8 cu. in. Maximum brake horsepower 87 at 3600 r.p.m. Compression ratio Std. 6.5 to 1. Torque recommended to tighten cylinder head—nuts 50 to 55 ft. lb. Cap screws 60 to 65 lb. ft.

Distributor

Auto-Lite single breaker point type with vacuum control. Breaker point gap .020 in. Vacuum to start advance mechanism 5 in. Breaker arm spring tension 18 to 20 oz.

Ignition Timing

With distributor hold down plate set to zero and breaker points set to .020 in. spark occurs at top dead center or when the top center mark on vibration damper aligns with pointer. Factory recommends that spark timing be set, within a range of 4 deg. before top center to 4 deg. after top center, so that a slight ping is audible when accelerating under wide open throttle from 10 m.p.h. in high gear.

Valves

Seat angle of valves 45 deg. Alloy inserts are used as exhaust valve seats. Operating tappet clearance—inlet .006 in. Exhaust .008 in. hot. With this clearance valve lifts 5/16 in. Tappet clearance for valve timing—inlet .011 in., exhaust .013 in.

Valve Springs

Spring pressure 77 to 83 lb. with valve open; 34 to 38 lb. with valve closed.

Valve Timing

With inlet tappets set to .011 in. and exhaust tappets set to .013 in. inlet opens 6 deg. after top center or when the 6 deg. mark on vibration damper aligns with pointer. Exhaust closes 8 deg. after top center.

Pistons and Rings

Own make, cam ground, split skirt, aluminum alloy with steel strut. Clearance at top .022 in. at skirt .0005 in. (desired). Ring groove depth—oil .177 in. Compression .157 in. Width of rings—oil 5/32 in. Compression ⅛ in. 4 rings are used per piston. Wrist pin is 55/64 in. diameter, 2¾ in. long, and is full floating. Rod and piston assemblies may be removed from above.

Connecting Rods

Lower bearing is a steel backed babbitt removable insert. Clearance .0005 to .0025 in. End play .0055 to .0115 in. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are steel backed removable inserts. Main bearings may be renewed from below. It is necessary to take off timing case cover in order to remove front main bearing cap.

Carburetor

Stromberg BXV-3.

Generator

Maximum charging rate cold 28 amp. at 8 volts 2000 r.p.m. Hot 28 amp. at 8 volts 2500 r.p.m. Cutout relay closes at 6.4 volts, opens at zero to 3 amp. reverse current. Voltage regulator is set to 7.1 to 7.4 volts hot.

Transmission Control

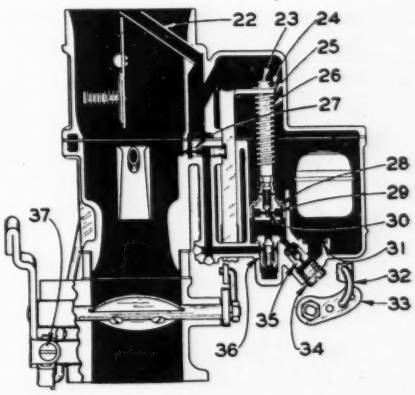
Adjust gear shift control rod as follows: 1—Remove control rod from the shifter lever at transmission. 2—Set transmission in neutral and set shift lever (at steering column) in the neutral position. 3—Move transmission lever about ⅛ in. towards rear of car (to remove free play) and adjust control rod so that it freely enters transmission lever. Adjust gear selector cable as follows: Loosen clamp screw which holds cable at the steering column end. 2—Set gear shift lever in neutral position. 3—Turn sleeve screw (at bottom of steering column) until slight play is felt in the cable at steering column end. Now turn sleeve screw just enough to remove this play. Now tighten clamp screw.

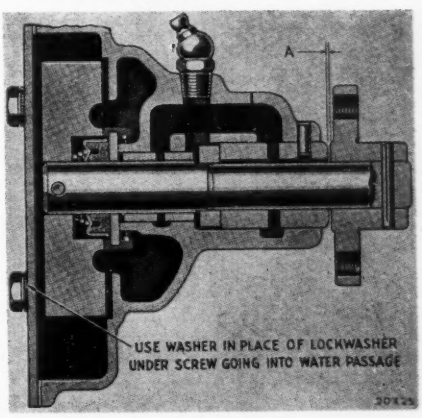
Transmission Disassembly

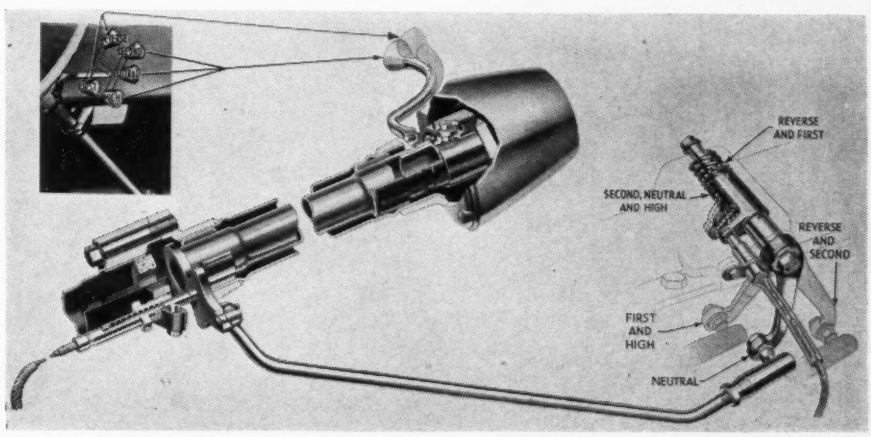
1—Remove transmission from car. 2—Remove the gear shifter rail retainer screws and lift out the fork and rail assemblies. (Careful of poppet balls and springs.) 3—Remove universal joint flange. 4—Remove brake support and brake assembly. 5—Pull mainshaft assembly out back of case (Careful not to touch the sliding clutch assembly when removing mainshaft.) 6—Remove countershaft lock plate from rear of case. 7—Drive countershaft through rear of case letting gear cluster fall to bottom of case. 8—Remove main drive pinion cover and main drive pinion from front of case. 9—Lift out countershaft gear cluster. 10—Push idler shaft out through rear of case and lift out idler gear. 11—Remove snap ring from front end of mainshaft and pull the hub out of the sliding clutch. (Snap rings should not be used a second time.) Reassemble in reverse order. Countershaft gear endplay .002 to .008 in. Second speed gear endplay .003 to .008 in.

Spark Plugs

Auto-Lite A-7 with gap set to .025 in.







FORD

V-60

Engine

Vee type, 8-cylinder engine, 2.6 in. bore x 3.2 in. stroke. Piston displacement 136 cu. in. Maximum brake horsepower, 60 at 3500 r.p.m. Compression ratio 6.6 to 1. Firing order 1-5-4-8-6-3-7-2. Tighten cylinder heads to 30 ft. lbs. of torque.

Distributor

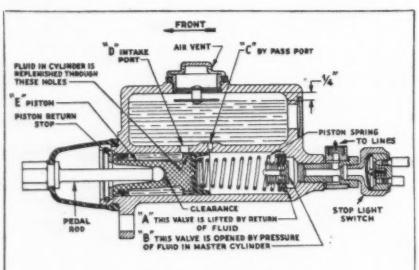
Own make with double breaker points. Breaker point gap .014 in. to .016 in. Breaker spring tension 20-24 oz. Automatic advance starts at 400 r.p.m. and ends at 3000 r.p.m. Total automatic advance 16 degrees (crankshaft).

Ignition Timing

With breaker points set to .015 in. spark should occur 4 degrees before top center. Distributor can be installed on engine in correct position only.

Valve Springs

Seat angle of inlet and exhaust valves, 45 degrees. Hardened seat inserts are used for exhaust valves. Valve spring pressure 26-30 lbs. at 2.05 in. Valve tappet clearance .0125 in. to .0135 in.



Pistons and Pins

Pistons are lightweight cast alloy steel. Width of compression ring grooves .095 in. Width of oil ring groove .158 in. Piston pin diameter .6876 in. to .6879 in. Length 2.368 in. Clearance of pin in piston .0004 in. maximum.

Connecting Rods

Rod bearings are full floating type with inner and outer bearing surfaces and are interchangeable. Rods and pistons are removable from above.

Main Bearings

Main bearings are steel backed inserts with piloted bearing caps. Diameter 1.999 in. No shims used.

Spark Plugs

Standard equipment Champion H10, 14 mm. Set to .025 in.

Battery

Own make, 100 ampere hours. Height 7.1 in., width 7.2 in., length 10.5 in. Positive terminal grounded.

Generator

Own make, third brush type.

Starter

Own make. Engine cranking speed 100 r.p.m. Maximum torque, 14 ft. lbs. Lock test 500 amperes.

Front Axle

Reverse Elliott I-beam section. Caster angle 4½ deg. to 9 deg., camber ¼ deg. to 1 deg., camber plus side inclination, 8¼ deg. to 9 deg. Toe-in 1/16 in.

Rear Axle

Three-quarter floating with straddle mounted pinion. Pinion bearings are adjusted by means of a nut on pinion shaft. It is necessary to remove rear to make this adjustment. Differential bearings may be adjusted slightly by changing shims between banjo and tube flanges.

Brakes

Brakes are Lockhead hydraulic. Wheel cylinders are step cut with larger piston acting on forward shoe. Diameters of wheel cylinder pistons are 1¼ in. front of front cylinders, 1⅛ in. front of rear cylinders, 1 in. rear of both front and of rear cylinders. These dimensions provide 55 per cent braking on front wheels. To adjust brakes, turn cam on forward shoe until shoe is tight against drum and then back off cam until wheel is just free of drag. Repeat on reverse shoe and then adjust brakes on other wheels in the same manner. If necessary to adjust anchors, proceed as follows: Loosen anchor lock nut, apply 25 to 35 lbs. pressure to pedal and turn mark on anchor down gently until shoe touches drum. Tighten lock nut, making sure that anchor is held as nut is tightened. Remove pressure from brake pedal and see that brake does not drag. Repeat on other brake shoes.

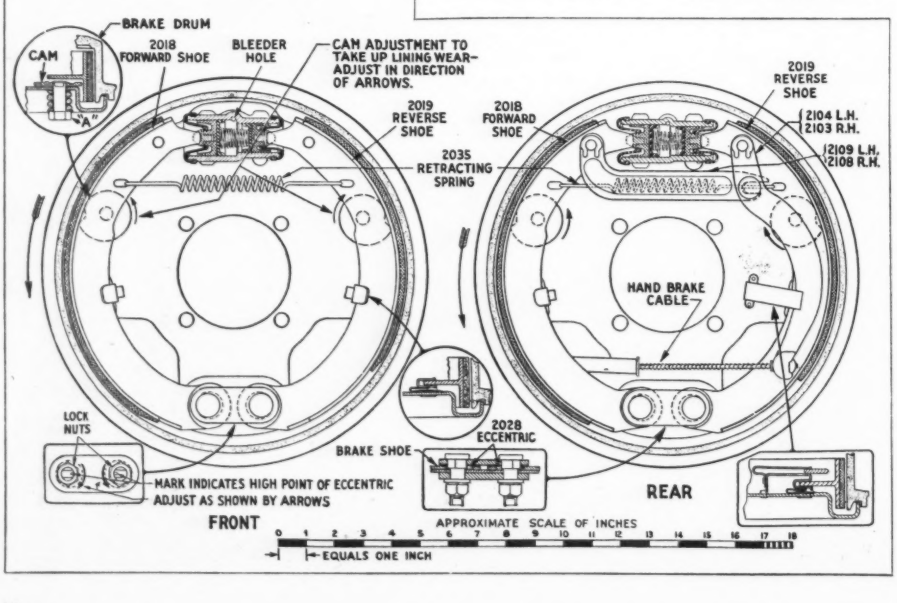
Starter Switch

Starter switch button is located on instrument panel and operates magnetic starter switch which is mounted on front of dash. An auxiliary starter button is provided at bottom of magnetic starter switch.

Steering Gear

Worm and double roller. To adjust, jack up front wheels and disconnect drag link. Set steering wheel in straight ahead position and remove lock nut and lock plate from upper housing cover. Turn roller shaft adjustment screw enough to remove excess play between roller teeth and worm. Replace lock plate and nut, making sure that lock plate is in locked position before tightening nut. If necessary to adjust steering gear worm bearings, loosen four housing end plate screws about ⅛ in. Loosen first shim and remove it and recheck adjustment. Remove additional shims if necessary. Shims used are .0025 in., .005 in. and .010 in. Never remove pitman arm except by use of proper puller as worm or rollers may be damaged.

The steering gear may be aligned by loosening the screws holding the column bracket and the three screws that hold the steering gear housing to frame. Then tighten the bracket to panel screws and tighten the housing to frame screws. This procedure should relieve any distortion or misalignment.



FORD

V-85

Engine

Starting serial No. 18-4661001. V-type, 8 cylinder engine, 3 1/16-in. bore x 3¾-in. stroke. Piston displacement 221 cu. in. Maximum brake horsepower 85 at 3800 r.p.m. Compression ratio 6.15 to 1. Firing order 1-5-4-8-6-3-7-2. Tighten cylinder head nuts to 50 ft. lb. of torque.

Distributor

Own make with double breaker points and vacuum controlled advance mechanism. Breaker point gap .014 in. to .016 in. Breaker spring tension 20-24 oz. Automatic advance starts at 400 r.p.m. and ends at 3000 r.p.m. Total automatic advance 16 deg. (crankshaft).

Ignition Timing

With breaker points set to .015 in., spark should occur 4 deg. or 1½ flywheel teeth before top center. Distributor can be installed on engine in correct position only.

Valves and Valve Springs

Seat angle of inlet and exhaust valves 45 deg. Hardened seat inserts are used for both inlet and exhaust valves. Valve spring pressure 37-40 lb. at 2.13 in. Valve tappet clearance .0125 in. to .0135 in.

Pistons and Pins

Pistons are lightweight cast alloy steel. Width of compression ring grooves .095 in. Width of oil ring groove .157 in. Piston pin diameter .750 in. Length 2.850 in. Clearance of pin in piston .0005 in. maximum.

Connecting Rods

Rod bearings are full floating type with inner and outer bearing surfaces and are interchangeable. Rod and piston assemblies are removable from above.

Main Bearings

Main bearings are steel backed inserts with piloted bearing caps. Diameter 2.50 in. No shims used.

Spark Plugs

Standard equipment Champion H10, 14 mm. Set to .025 in.

Battery

Own make, 17 plate, 100 amp. hr. Height 7.1 in., with 7.2 in., length 10.5 in. Positive terminal grounded.

Generator

Own make, third brush type on standard models, two brush type with regulator on De Luxe models. Maximum output 26 amp. (De Luxe models) 17 amp. (Standard models). Cut out closes at 7 volts.

Starter

Own make. Engine cranking speed 100 r.p.m. Maximum torque 14 ft. lb. Lock test 500 amp.

Front Axle

Reverse Elliott I-beam section. Caster angle 4½ deg. to 9 deg., camber ¼ deg. to 1 deg. camber plus side inclination 8¼ deg. to 9 deg. Toe-in 1/16 in.

Steering Gear

Worm and double roller. Up and down play in worm is controlled by shims at lower housing cover. Removing shims tightens bearing. Mesh of gear is controlled by screw in upper housing cover. Turning screw inward brings rollers closer to worm.

Rear Axle

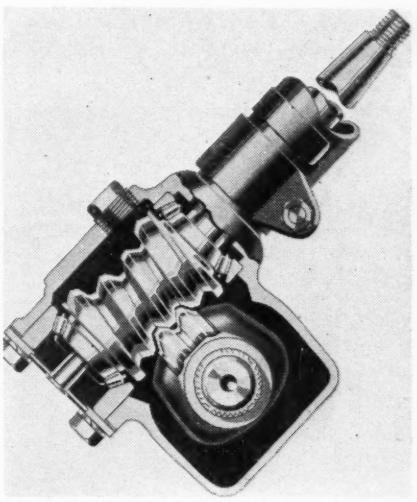
Three-quarter floating with straddle mounted pinion. Pinion bearings are adjusted by means of a nut on pinion shaft. It is necessary to remove rear axle to make this adjustment. Differential bearings may be adjusted slightly by changing shims between banjo and tube flanges.

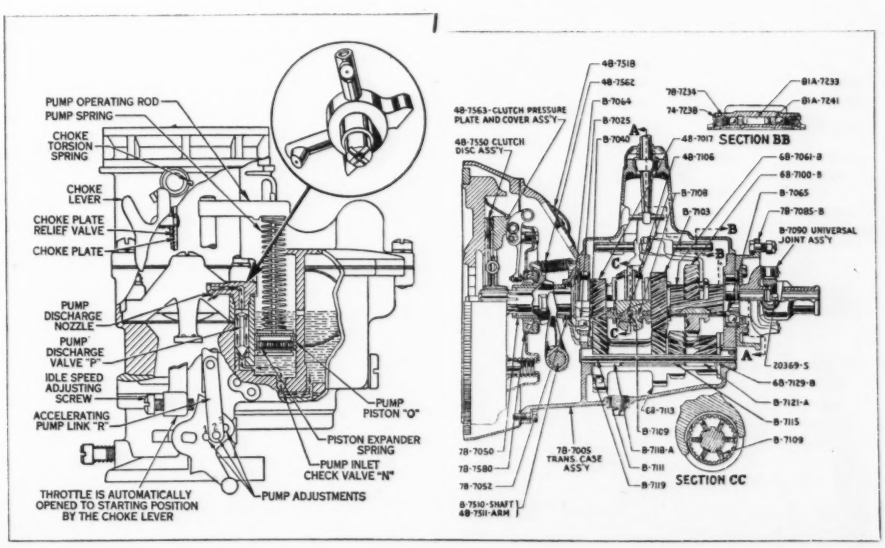
Brakes

Brakes are Lockheed Hydraulic. Wheel cylinders are step cut with larger piston acting on forward shoe. Diameters of wheel cylinder pistons are 1¼ in. front of front cylinders, 1⅛ in., front of rear cylinders, 1 in. rear of both front and rear cylinders. These dimensions provide 55 per cent braking on front wheels. To adjust brakes, turn cam on forward shoe until shoe is tightened against drum and then back off until wheel is just free of drag. Repeat on reverse shoe and then adjust brakes on other wheels in same manner. If necessary to adjust anchors, proceed as follows: Loosen anchor lock nut, apply 25 to 35 lb. pressure to pedal and turn mark on anchor down gently until shoe touches drum. Tighten lock nut, making sure that anchor is held as nut is tightened. Remove pressure from brake pedal and see that brake does not drag. Repeat on other brake shoes.

Starter Switch

Starter switch button is located on instrument panel and operates magnetic switch which is mounted on front of dash. An auxiliary starter button is provided at bottom of magnetic starter switch.





GRAHAM

SPECIAL AND SUPERCHARGED

Engine

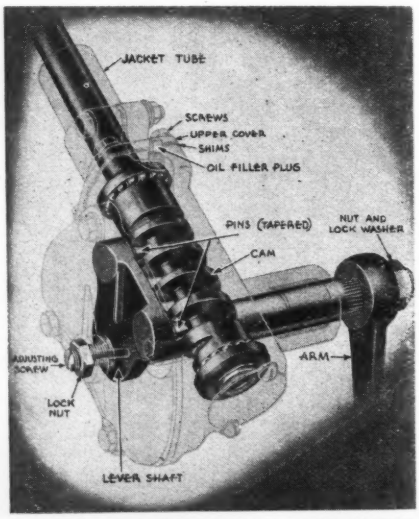
Six cylinder L head. 3¼ in. bore x 4⅜ in. stroke, **piston displacement** 217.8 cu. in. Taxable **horsepower 25.3.** Maximum brake horsepower 116 at 4000 r.p.m. on supercharged models; On standard models 90 at 3600 r.p.m. Maximum torque — supercharged models 180 ft. lb. Standard models 160 ft. lb. at 3600 r.p.m. Compression ratio—supercharged models 6.7 to 1; standard models 6.5 to 1. Compression pressures—standard models 120 lb.; supercharged models 130 lb. at cranking speed. Torque to tighten cylinder head bolts 39 to 42 ft. lb. on aluminum heads; 56 to 60 ft. lb. on cast iron heads. Firing order 1-5-3-6-2-4.

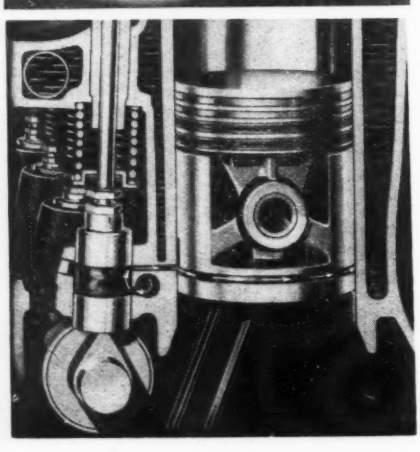
Distributor

Delco Remy model 623-A with vacuum advance. Maximum automatic advance 16 deg. Vacuum advance 10 deg. Breaker point gap .018 in. Breaker arm spring tension 17 to 21 oz.

Spark Plugs

Champion model H-10. Set gap to .020 to .025 in.





Ignition Timing

With breaker points set to .018 in. spark occurs at top center on the standard models, this is when the top center mark on flywheel alines with pointer. On supercharged models spark occurs 4½ deg. after top center or when the EX-CL (exhaust closes) mark on flywheel alines with pointer. Timing inspection hole is located in the right front face of flywheel **housing.**

Valves

Operating tappet clearance .010 in. Exhaust valve tappet clearance for valve timing .012 in. Seat angle of valves—Inlet 30 deg.; Exhaust 45 deg. Valve spring pressure 42 to 46 lb. at 1 21/32 in. 89 to 97 lb. at 1⅜ in. Free length 2 in.

Valve Timing

With exhaust tappets set to .012 in. exhaust valve closes 4½ deg. after top center or when the EX-CL mark on flywheel alines with pointer. There should be 10 pins of the timing chain between the marks on the cam and crankshaft sprockets counting the pin at each mark.

Pistons

Pistons are cam ground aluminum, with strut. Clearance at top 0.24 in. at skirt .0025 in. Weight 14⅛ oz. Depth of ring grooves—oil .177 in.; compression .157 in. Number and width of rings—oil 2 5/32 in.; compression 2 3/32 in. Piston and rod assemblies may be removed from above.

Connecting Rods

Rod bearings are steel backed cadmium silver inserts. Clearance .002 in. End play .004 to .006 in. Rod and piston assemblies may be removed from above.

Main Bearings

Main bearings are steel backed cadmium silver inserts which may be renewed from below. Bearing inserts are available in standard and .001 in. undersizes. Clearance .002 in. Crankshaft end play .004 to .006 in. Crankshaft thrust is controlled by shims at the front bearing. To add or remove shims it is necessary to remove front end cover and both timing gears.

Carburetor

Marvel model C-2 used on standard models. Marvel model C-3 used on supercharged models. The following adjustments apply to both models. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Idle speed should be 6-7 miles per hour. Accelerating pump adjustment: Accelerating pump arm has three holes, set link in center hole for normal driving, No. 3 hole for extreme cold weather or to secure maximum accelerating charge. Range adjustment: Range adjustment is properly set at the factory. To change this adjustment, remove air cleaner and plug in top of float bowl. (This will make range adjusting needle accessible), with small screw driver, turn needle clockwise to make the mixture leaner or counter-clockwise to make it richer. Metering pin: With vacuum step up piston pushed down on its seat, distance from top of metering pin to top of metering pin housing should be 13/64 in. Float height: Distance from top of float to float cover should be 19/32 in. with float in raised position.

Generator

Delco-Remy model 1,100,007 used on supercharged models; Delco-Remy model 1,100,455 used on standard models. Maximum charging rate hot —supercharged, 25 to 28 amp., 8.0 volts, 3600 r.p.m.; standard, 18 amp., 8.0 volts at 2900 r.p.m.

Starter

Delco-Remy model 738-T with sliding gear. Lock test 525 amp., 3.3 volts, 12 ft-lbs. No load test, 65 amp., 5.0 volts, 5000 r.p.m. Starter pinion meshes from front.

Battery

Willard, 15 plate. Capacity 95-105 amp. hr. at 20-hr. rate.

Steering Gear

Ross cam and twin lever. End play in worm bearings is controlled by shims under the housing upper cover. Remove shims to tighten bearing. End play in cross shaft and mesh of pins in gear is controlled by the adjusting screw in the housing side cover plate.

Brakes

Lockheed hydraulic. Minor adjustment: Turn cam adjustment on forward shoe until shoe drags and back off until wheel is just free. Do the same to the other shoe on that wheel. Repeat at the other wheels. Major adjustment: Loosen anchor lock nuts. Turn cam adjusters until wheel just drags. Now turn eccentric anchor in a direction which will move the bottom of the shoe downwards and outwards until wheel turns freely. Again turn cam adjuster until wheel drags and again turn eccentric anchor (in the same direction as previously) until wheel is free. Continue to repeat these two operations until turning the anchor does not free the wheel. Lock the anchor in this position by tightening the lock nut. Now follow the minor adjustment.

HUDSON

MODELS 92. 93

Engine

6 cylinder L head. 3 in. bore x 5 in. stroke, piston displacement 212 cu. in. Maximum brake horsepower model 92-96 at 3900 r.p.m.; model 93-101 at 4000 r.p.m. Maximum torque model 92- 160 ft. lbs. at 1200 r.p.m. model 93- 168 ft. lbs. at 1200 r.p.m. Compression ratio 6.25 to 1. Compression pressures 120 lbs. at 125 r.p.m. Firing order 1-5-3-6-2-4. Torque recommended to tighten cylinder head 44 to 47 ft. lbs.

Distributor

Auto-Lite model IGW-4126-A single breaker point type. Maximum automatic automatic advance 28 (flywheel) degrees. Breaker point gap .020 in. Breaker arm spring tension 17 to 20 oz. Ignition coil draws 4.5 amps with engine stopped and points closed, 2.5 amps engine running.

Spark Plugs

Champion J-8-A with gap set to .032 in.

Ignition Timing

With breaker points set to .032 in. spark occurs at top center or when the top center mark on flywheel aligns with pointer. Timing inspection hole is located in the left front face of flywheel housing above starter.

Valves

Operating tappet clearance inlet .006 in., exhaust .008 in. Same clearance for valve timing. Seat angle of valves 45 deg.

Valve Springs

Spring pressure 40 lbs. with valve closed, 80 lbs. with valve open. Free length of spring 2343 in.

Valve Timing

With inlet tappets set to .006 in. and exhaust tappets set to .008 in. inlet valve opens 10 2/3 degrees before top center. This is nearly 4 flywheel teeth before the top center mark on flywheel. Exhaust closes 18 deg. 44 min. after top center. Mark on crankshaft gear should come between the two marks on the camshaft gear.

Carburetor

Carter model 430-S dual downdraft with Climatic control is used on the Model 93. For adjustment of this carburetor see the Hudson eight cylinder model. Carter models 437-S and 438-S used on the model 92. Idle adjustment: Idle adjusting screw controls gas, turn screw out for richer mixture. Standard setting is ½ to 1¼ turns open. Do not idle engine below 350 r.p.m. Float height: Distance from top of float to float bowl cover should be ⅜ in. with float in raised position. Metering rod: Economy step .071 in. Middle step tapers to .066 in. Power step .045 in. Set metering rod with gage No. T109-25 (2.795 in.). Accelerating pump: With pump connector link in lower hole, pump plunger should move 7/32 in. from closed to wide open throttle position. Adjust by bending throttle connecting rod at lower angle.

Pistons

Cam ground Lo-Ex aluminum alloy. Weight 10.5 oz. Clearance at top .016 in., at skirt .0005 to .001 in. Width of ring grooves Oil .1485 in. Compression .1485 in. Number and width of rings Oil 2- .187 in., compression 2- .093 in. Piston and rod assemblies may be removed from above. Wrist pin floats in piston and rod.

Connecting Rods

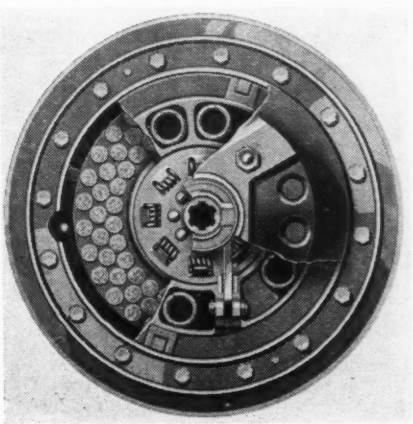
Lower bearing is spun in babbitt. No shims are used. Clearance .0003 to .0006 in. End play .007 to .013 in. Rod and piston assemblies may be removed from above. Torque recommended to tighten rod bolts 51 to 54 ft. lbs.

Generator

Auto-Lite GDS-4801-A. Third brush type with voltage regulator. Maximum charging rate 35 amps, 8.0 volts, 3000 r.p.m. cold; 29 amps 8.0 volts, 3100 r.p.m. hot. Cutout relay closes at 6.5 to 7.25 volts, opens at zero to 3 amps reverse current.

Starter

Auto-Lite model MAB-4075 with Bendix drive. Lock test 780 amps, 4 volts. 22.5 ft. lbs. torque. No load test 60 amps 5.5 volts, 3700 r.p.m. starter pinion meshes from rear.



Starter Switch

Solenoid switch, operated by a push button switch on dash.

Battery

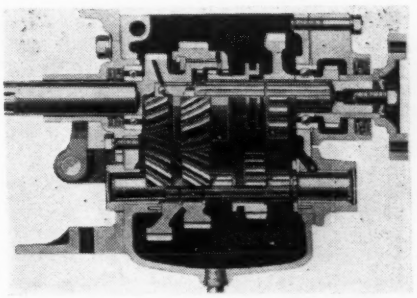
National 17 plate. Capacity 96 ampere hours at 20 hour rate.

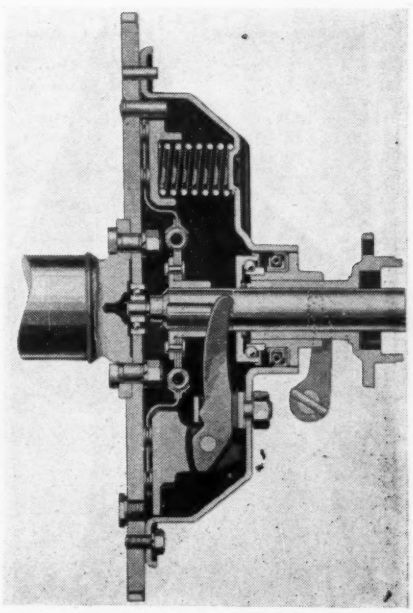
Front Axle Data

Caster 1½ degrees plus or minus ½ degree. Camber 1 to 1½ degrees. King pin slant 7 degrees. Toe-in. zero to .125 in. Car turning radius: Right 21.874 ft. Left 23.126 ft.

Steering Gear

Gemmer worm and double roller integral housing type with external mesh adjustment. End play in worm is controlled by shims under the housing lower cover plate. Removing shims at this point will decrease end play. Mesh of gear is controlled by the adjusting screw in the housing side cover plate. Remove acorn nut and turn adjusting screw until play in gear is removed. Replace acorn nut.





HUDSON

112

Engine

Own L head. 3 in. bore X 4⅛ in. stroke, piston displacement 175.0 cu. in. Maximum brake horsepower 86 at 4000 r.p.m. Maximum torque 138 ft. lbs. at 1400 r.p.m. Compression ratio 6.5 to 1. Compression pressure 115 lbs. at 125 r.p.m. Firing order 1-5-3-6-2-4.

Distributor

Auto-Lite model IGW-4125-A single breaker point type. Maximum automatic advance 28 (flywheel) degrees. Breaker point gap .020 in.

Spark Plugs

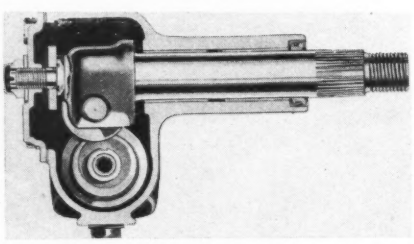
Champion J-8-A with gap set to .032 in.

Ignition Timing

With breaker points set to .020 in. spark occurs at top center on model 98; 2½ degrees before top center on the model 90. Flywheel marks are "T C 1-6 and IGN." Timing inspection hole is located on front face of flywheel housing.

Connecting Rods

Lower bearing is spun in babbitt. Clearance .0003 to .0006 in. End play .007 to .013 in. Rod and piston assemblies may be removed from above. Torque recommended to tighten rod bolts 51 to 54 ft. lbs.



Gemmer Gear with external mesh adjustment

Valves

Operating tappet clearance inlet .006 in. exhaust .008 in. hot. Same clearance for valve timing. Seat angle of valves 45 degrees.

Valve Springs

Spring pressure 40 lbs. with valve closed, 80 lbs. with valve open. Free length of spring 2.343 in.

Valve Timing

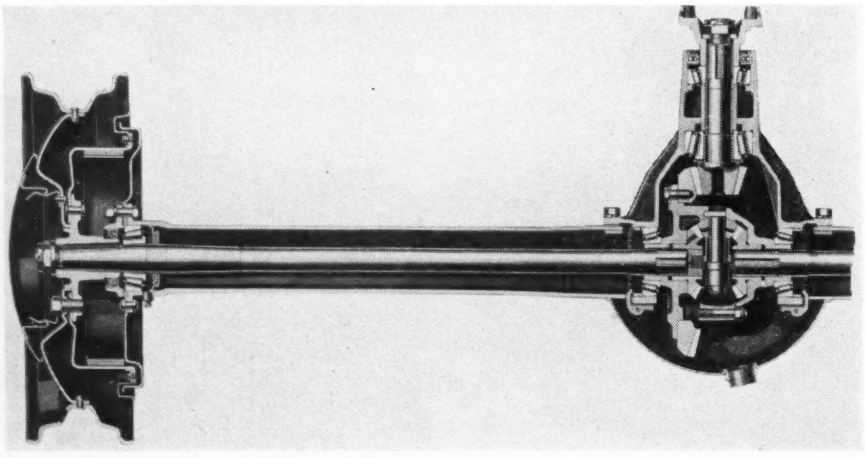
With inlet tappet set to .006 in. and exhaust tappet set to .008 in. inlet valve opens .10 2/3 degrees before top center. This is nearly 4 flywheel teeth before the "T C" mark on flywheel. Mark on crankshaft gear should come between the two marks on the camshaft gear.

Carburetor

Carter model 438-S single downdraft type. Float height: Distance from top of float to float cover should be ⅜ in. with float in raised position. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Standard setting is ½ to 1¼ turns open. Do not idle engine below 350 r.p.m. Metering rod economy step .071 in., middle step tapers to .066 in. power step .045 in. Length 3 25/64 in. To time metering pin correctly, use Gage No. T109-25. Accelerating pump: With pump connector link in lower hole, pump plunger should move 7/32 in. from closed to wide open throttle position. Adjust by bending throttle connecting rod at lower angle.

Generator

Auto-Lite model GDS-4801-A on cars with radio; Model GBM-4609-A on cars without radio. The following data applies to the model GDS-4801-A. Maximum charging rate hot 29 amps at 8.0 volts 3000 r.p.m.; Cold 35 amps at 8.0 volts 3000 r.p.m. Cutout relay closes at 6.5 to 7.45 volts, opens at zero to 2 amps reverse current. The following data applies to the model GBM-4609-A. Maximum charging rate hot 18 amps at 8.0 volts 2400 r.p.m. Cold 20 amps at 8.0 volts 2200 r.p.m. Cutout relay closes at 6.5 to 7.45 volts, opens at zero to 2 amps reverse current.



Battery

National 17 plate. Capacity 96 amps at 20 hour rate.

Pistons

Cam ground Lo-Ex aluminum alloy. Weight 10.5 oz. Clearance at top .016 in. At skirt .0005 to .001 in. Ring groove depth—Oil .1485 in. Compression .1485 in. Width and number of rings—Oil 2- .187 in. Compression 2- .093 in. Wrist pin floats in piston and rod. Piston and rod assemblies may be removed from above.

Main Bearings

Mains are bronze backed babbitt equipped with laminated shims. To renew main bearings it is necessary to pull the engine. Torque recommended to tighten main bearing bolts 89 to 93 ft. lbs.

Front Axle Data

Caster 1½ deg. plus or minus ½ degree. Camber 1 to 1½ degrees. King pin slant 7 degrees. Car turning radius 22 ft. 7½ inches left, 20 ft. 6 in. right. Toe in zero to ¼ in.

Steering Gear

Gemmer worm and double roller integral housing type with external mesh adjustment. End play in worm is controlled by shims at the housing lower cover plate. Removing shims will decrease end play. Mesh of gear is controlled by the thrust bolt in the housing side cover plate. Remove acorn nut and turn adjusting screw until gear lash is removed. Replace acorn nut.

Rear Axle

Own make semi floating. Pinion mesh is adjusted by means of shims between the pinion gear and the pinion rear bearing.

It is necessary to remove pinion to change these shims. Pinion bearings are adjusted by means of shims between the bearing spacer and the rear bearing zone. Differential side bearings are adjusted by means of bearing cages. Axle bearings are adjusted by means of shims between the housing flange and the bearing cap. It is not necessary to remove brake backing plates to change these shims.

HUDSON

MODELS 95, 97

Engine

8 cylinder L head 3 in. bore X 4½ in. stroke, piston displacement 254 cu. in. Maximum brake horsepower 122 at 4200 r.p.m. Maximum torque 198 ft. lb. at 1600 r.p.m. Compression ratio 6.25 to 1. Compression pressure 118 lb. at 125 r.p.m. Torque to tighten cylinder head nuts 53 to 56 ft. lb. Firing order 1-6-2-5-8-3-7-4.

Distributor

Auto-Lite model IGP-4008-A with Octane selector. Maximum automatic advance 35 (flywheel) degrees. Breaker point gap .017 in. Ignition coil Auto-Lite Model CE-4635. Amperage draw of coil, engine stopped, 4.5 amps. engine idling 2.5 amps.

Spark Plugs

Champion J-8-A. Set gap to .032 in.

Ignition Timing

With breaker point gap set to .017 in. and Octane selector set to zero spark occurs at top center or when the T-C mark on flywheel aligns with pointer. Timing inspection hole is located in the left front face of flywheel housing above starter.

Valves

Operating tappet clearance inlet .006 in. exhaust .008 in. hot. Same clearance for valve timing. Seat angle of valves 45 degrees.

Valve Springs

Spring pressure 40 lb. with valve closed, 80 lb. with valve open. Valve lift .343 in. Free length of valve spring 2.343 in.

Valve Timing

With inlet tappet set to .006 in. and exhaust tappet set to .008 in. inlet valve opens 10 2/3 degrees or nearly 4 flywheel teeth before the T-C mark on flywheel. Exhaust closes 18 2/3 deg. or nearly 7 flywheel teeth after the T-C mark. Punch mark on the crankshaft gear should come between the two punch marks on the camshaft gear.

Pistons

Cam ground Lo-Ex aluminum alloy. Weight 10.5 oz. Clearance at top .016 in. at skirt .0005 to .0010 in. Depth of ring grooves Oil .1485 in. Compression .1485 in. Number and width of rings—Oil 2 at .187 in. Compression 2 at .093 in. Piston and rod assemblies may be removed from above.

Connecting Rods

Lower bearing is spun in babbitt. Clearance .0003 to .0006 in. End play .007 to .013 in. Torque to tighten rod bolts 51 to 54 ft. lb. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are bronze backed babbitt equipped with laminated shims. To renew main bearings it is necessary to remove engine. Clearance .001 in. Crankshaft endplay .006 to .012 in. Center main takes crankshaft thrust. Torque to tighten main bearing bolts 89 to 93 ft. lb.

Carburetor

Carter model 430-S dual downdraft with Climatic Control. Idle adjustment: Idle adjusting screws control gas, turn out for richer mixture. Do not idle engine below 350 r.p.m. Standard setting for idle screws is ¼ to 1 turn open. Float height: Distance from top of float to float cover should be 3/32 in. with float in raised position. Accelerating pump: With pump connector link set in hole on long radius, stroke of plunger should be 9/32 in. from closed to wide open throttle position. Adjust by bending throttle connecting rod at lower angle. Metering rod: Economy step .062 in. middle step tapers to .055 in. power step .047 in. Set metering rods with gage No. T109-113 (2.280 in.).

Generator

Auto-Lite model GDS-4801-A with voltage regulator. Maximum charging rate hot: 29 amps., 8 volts, 3100 r.p.m. Cold 35 amps., 8 volts, 3000 r.p.m. Cutout relay closes at 6.5 to 7.25 volts, opens at zero to 2 amps. reverse current. Voltage regulator is set to 7.3 to 7.6 volts cold. 7 to 7.3 volts hot.

Starter

Auto-Lite model MAB-4075 with Bendix drive. Lock test 780 amps., 4 volts, 22.5 ft. lb. torque. No load test 60 amps., 5.5 volts, 3700 r.p.m. Starter pinion meshes from rear.

Starter Switch

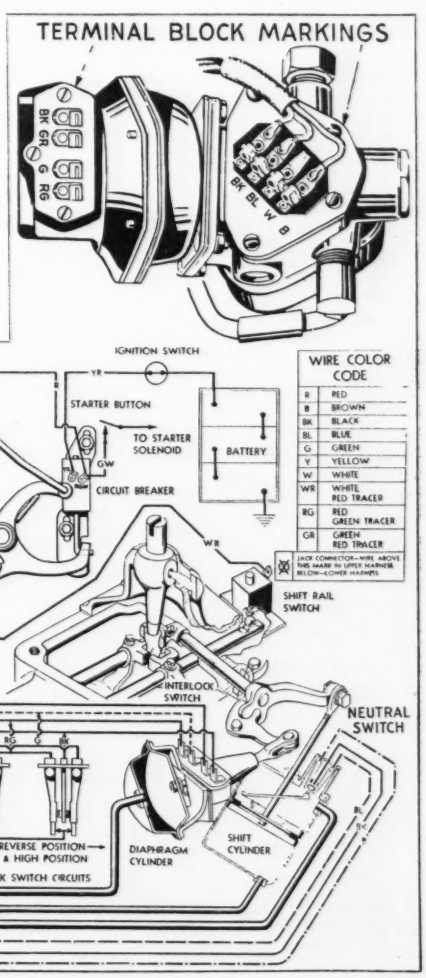
Solenoid starter switch operated by a push button switch on dash.

Battery

National 19 plate. Capacity 108 ampere hours at 20 hour rate.

Steering Gear

Gemmer worm and double roller integral housing with external mesh adjustment. End play in worm is controled by shims under the housing-lower bearing plate. Removing shims at this point will decrease end play in worm. Mesh of gear is controled by the adjusting screw in the housing side cover plate. Remove acorn nut and turn adjusting screw until backlash of gear is removed. Replace acorn nut.



LA SALLE

39-50

Engine

Starting Serial Numbers 2290001. Vee type engine, eight cylinders, 3⅜ in. bore x 4½ in. stroke. Piston displacement 322 cu. in. Standard compression ratio 6.25 to 1. Firing order 1L-4R-4L-2L-3R-3L-2R-1R. Maximum brake horsepower 125 at 3400 r.p.m.

Carburetor

Carter WDO-423S, 1⅛ in. dual down draft.

Battery

Delco model 17E1W. Capacity 115 ampere hours. Positive terminal grounded.

Generator

Delco-Remy Model 1101056. Maximum charging rate 28-30 amperes cold. Generator type, peak load.

Cutout relay voltage at closing 6.9 to 7.5. Armature speed at cutout relay closing 850 r.p.m. Car speed for maximum charging rate, 50 mph.

Starting Motor

Delco-Remy Model 727V. No load test 5500 r.p.m., 65 amperes at 5 volts.

Lock test, 600 amperes at 3 volts. Lock torque 16 ft. lb.

Starter Switch

Delco-Remy push button operating solenoid shifted gear.

Steering

Saginaw worm and double roller.

To adjust, back off worm adjustment lock nut and adjusting screw, also back off roller adjustment lock nut. Turn adjusting screw in against roller shaft until all play is taken up and a slight binding is felt when turning steering wheel with roller off high spot. Back off adjusting screw until adjustment is free and tighten lock nut. Turn steering wheel 1½ to 2 turns from straight ahead position and adjust screw at bottom of housing until a pull of about 1 lb. at rim of steering wheel is necessary to move wheel around. Tighten worm adjustment lock nut. Loosen eccentric adjustment lock screw and turn quadrant on eccentric sleeve to adjust back lash between worm and roller. Tighten locking screw and recheck adjustment.

Front Suspension

Caster 1¼ to 2½ deg. negative. Camber zero to ¾ deg. Toe-in 1/32 in. to 3/32 in. King pin inclination 5 deg., 6 min.

Valves

Operating tappet clearance automatically adjusted by hydraulic lifters.

Seat angle of valves, 45 deg. Length of valve springs 2.21 in. Valve springs should weigh 66 lbs. at 1.926 in. and 145 lbs. at 1.581.

Valve Timing

With zero tappet clearance, inlet valves open at top dead center and exhaust valves close 10 deg. past top center.

Pistons

Aluminum alloy with T slot, anodized finish. Clearance at skirt, .0019 in.

Clearance at top land .023 in. Width of oil rings 5/32 in. Width of upper compression ring 3/32 in. Width of lower compression ring ⅛ in. Compression ring gap .007-.012 in., oil ring gap .007-.015 in.

Connecting Rods

Rod and piston assemblies are removable from above. Rod bearings are steel backed babbitt.

Main Bearings

Main bearings are bronze or steel backed babbitt. Clearance .0015 in. Crankshaft end play .001 in. to .005 in. End play is controlled by center main bearing. Main bearing cap screws should be tightened to 130-140 ft. lbs. of torque.

Distributor

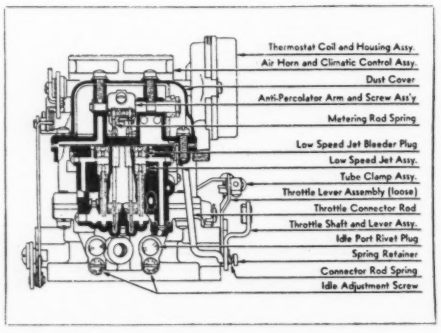
Delco-Remy No. 1110604. Maximum automatic advance 22 deg. Manual advance 20 deg. Breaker point gap .0125 in. to .0175 in.

Ignition Timing

Breaker points should open 5 deg. before top center.

Spark Plugs

Standard equipment is AC 104. Gap should be set to .025 in. to .030 in.

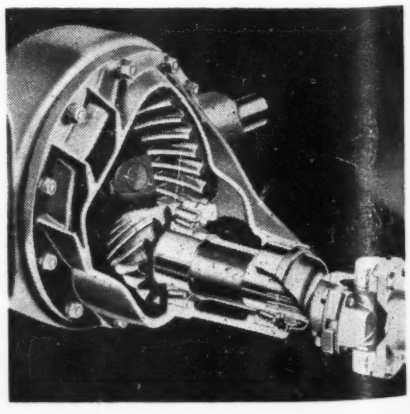


Brakes

Bendix Hydraulic with 12 in. drums. Lining per wheel 24½ in. x 2 in. x 3/16 in. Hand brake lever operates rear wheel brake shoes. To adjust brakes, jack up wheels and disconnect hand brake cables. Dismount all four wheels and remove inspection hole covers from the brake drum, and dust shield. Insert a .010 in. feeler gauge between the lining on the secondary shoe and the drum. Clearance between the lining and the drum can be taken up to the required .010 in. by turning the eccentric in the direction of forward wheel rotation. The clearance between the primary brake shoe and the drum is secured by turning the notched adjusting screw. Move outer end of tool toward the center of the wheel to decrease clearance until brake drags. Turn the adjusting wheel in the opposite direction until brake drum is free of drag. The operating rod that connects the brake pedal to the master cylinder must be properly adjusted. There should be ¼ in. to ⅜ in. free movement of the brake pedal before it starts the piston on its pressure stroke. If necessary to readjust brake anchors, loosen the locking nut and tap the pin lightly with a soft hammer in the direction required to equalize the clearance at both ends of the secondary shoe. Tighten the locking nut and recheck the clearance.

No adjustment is required on the hand brakes other than the elimination of slack in connections. To adjust linkage, apply hand brake slowly until slack is taken up in the linkage and the strut rod just starts to operate the brake shoe in one wheel unit.

Keep the brakes in this position by holding the cable and after fully releasing the hand lever, adjust the clevis on the front end of the cable so that the clevis pin can just be installed. If the brakes drag with the hand lever in the fully released position, back off the clevis adjustments until they are free.



LINCOLN ZEPHYR

1939

Engine

Starting serial number H-64641. Vee type, 12-cylinder engine, 2¾ in. bore x 3¾ in. stroke. Piston displacement 267 cu. in. Maximum brake horsepower, 110 at 3900 r.p.m. Compression ratio, 6.7 to 1. Firing order 1-4-9-8-5-2-11-10-3-6-7-12. Tighten cylinder head nuts to 40 ft. lbs.

Distributor

Own design, double braker type. Automatic advance with vacuum control. Advance starts at 400 r.p.m. and ends at 3000 r.p.m. Maximum advance 16 deg. (crankshaft). Breaker point gap .014 in. to .016 in. Breaker spring tension 20-24 oz. Resistance of primary ignition circuit, 1.0 to 1.33 ohms.

Ignition Timing

Spark occurs 4 deg. or 1¼ flywheel teeth before top center. Stationary points fire left cylinders, movable points fire right cylinders. Moving plate on right side of distributor upward advances spark, downward retards spark. Each graduation on scale represents 2 deg. Removing timing plate uncovers synchronizing adjustment. Turn synchronizing screw clockwise to advance spark on right side and turn anti-clockwise to retard spark on right side.

Spark Plugs

Standard equipment Champion H10. Set to .028-.030 in.

Valves and Valve Springs

Seat angle of inlet and exhaust valves, 45 deg. Hardened seat inserts are used for exhaust valves. Valve spring pressure 51-57 lbs. at 2.13 in. Valve lifters are hydraulic, self-adjusting.

Valve Timing

Inlet valves open 10½ deg. before top center and close 35½ deg. after bottom center. Exhaust valves open 51 deg. before bottom center and close 8 deg. after top center.

Pistons and Pins

Pistons are lightweight cast alloy steel. Width of compression ring grooves .096 in. Width of oil ring groove, .1885 in. Piston pin diameter, ¾ in., length 2.482 in. Clearance of pin in piston .0005 in. maximum.

Front Axle

Reverse Elliott type, I-beam section. Caster angle 1½ deg. to 6 deg. Camber ¼ deg. to ¾ deg., camber plus side inclination 4 deg. to 4¾ deg. Toe-in 1/16 in. to ⅛ in.

Connecting Rods

Rod bearings are removable inserts, fixed in rods. Rod and piston assemblies are removable from above.

Main Bearings

Main bearings are steel backed removable inserts piloted in cap. Crankshaft end play should be .002 in. to .006 in.

Generator

Own make No. 91A-10000, two brush type with regulator. Maximum output 26 amperes at 1200 engine r.p.m. Cutout closes at 7 volts.

Starter

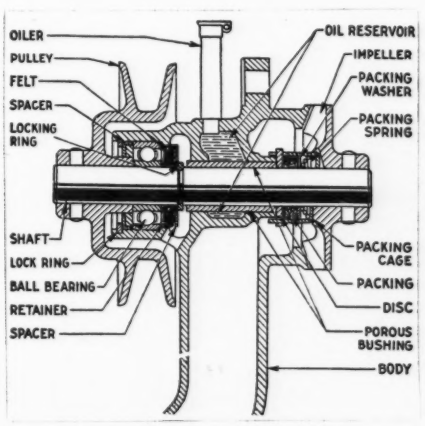
Own make. Normal engine cranking speed, 100 r.p.m. Maximum torque 14 ft. lbs. Lock test 500 amperes.

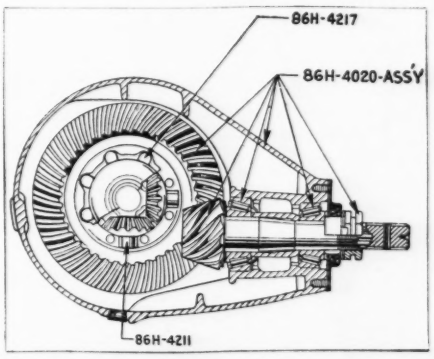
Steering Gear

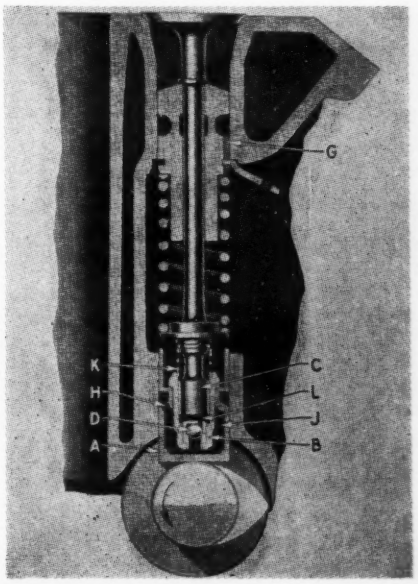
Worm and double roller. Amount of up and down play in worm is controlled by shims at housing bottom cover. End play in sector shaft is controlled by thrust screw. Turning inward on screw reduces play. Mesh of worm and sector is adjusted by shims at inside of housing and requires removal of gear. To remove play between worm and sector, remove shims, one at a time (after removing and disassembling steering gear) until correct adjustment is obtained.

Brakes

Brakes are Bendix Hydraulic with hand brake operating on rear shoes through cables. Diameter of master cylinder 1.062 in., front wheel cylinders 1.125 in., rear wheel cylinders 1.0 in. Diameter of brake drums 12 in. Length of lining per wheel 24 in., width 1¾ in., thickness 0.21 in. To adjust brakes, jack up all wheels and expand shoes by turning notched adjusting screws until wheels can just be turned by hand. Back off each adjusting screw 14 notches. Brake pedal should have ¼ in. to ½ in. free movement. The amount of free movement can be adjusted by turning back section of pedal rod after loosening lock nut. To adjust hand brake, set hand brake lever in first notch and apply 30 lbs. pressure to brake pedal, leaving this pressure applied during hand brake adjustment. Pull up all slack in cable and adjust conduit so that cable is exactly the right length with lever in first notch and pressure on pedal. To make a major adjustment of brakes, proceed as follows: With wheels removed (but with drums in place), loosen anchor pin lock nut one turn and tap lightly up or down, whichever is necessary, with a soft hammer. Insert a feeler gage through inspection hole in drum and set the adjusting screw and anchor so that the clearance is .010 in. all around. Tighten anchor pin lock nut securely and again check clearance to be sure that it has not been disturbed.







MERCURY

V-8

Engine

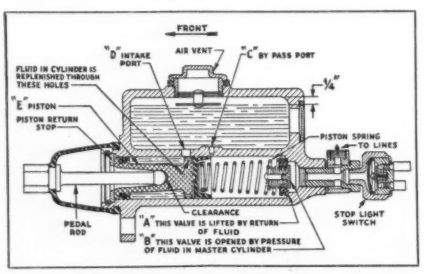
Starting serial number 99-1. Vee type, 8-cylinder engine, 3 3/16 in. bore x 3¾ in. stroke. Piston displacement 239 cu. in. Maximum brake horsepower 95 at 3600 r.p.m. Compression ratio 6.15 to 1. Firing order 1-5-4-8-6-3-7-2. Tighten cylinder head nuts to 50 ft. lbs. of torque.

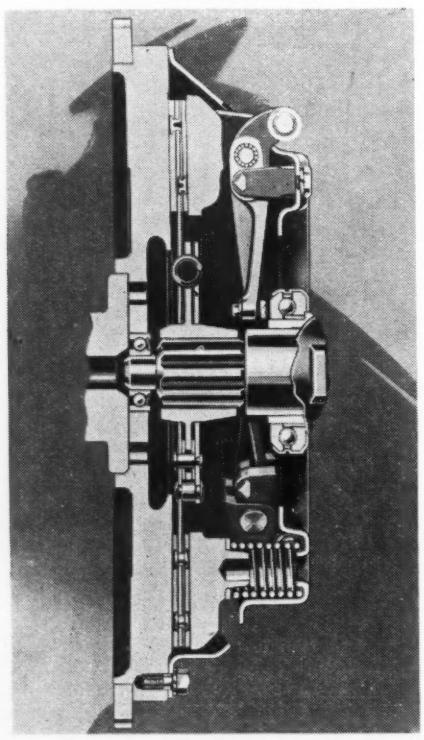
Distributor

Own make with double breaker points and vacuum controlled advance mechanism. Breaker point gap .014 in. to .016 in. Breaker spring tension 20-24 oz. Automatic advance starts at 400 r.p.m. and ends at 3000 r.p.m. Total automatic advance 16 deg. (crankshaft).

Ignition Timing

With breaker points set to .015 in., spark should occur 4 deg. or 1½ flywheel teeth before top center. Distributor can be installed on engine in correct position only.





Valves and Valve Springs

Seat angle of inlet and exhaust valves 45 deg. Hardened seat inserts are used for both inlet and exhaust valves. Valve spring pressure 37-40 lbs. at 2.13 in. Valve tappet clearance .0125 in. to .0135 in.

Pistons and Pins

Pistons are lightweight cast alloy steel. Width of compression ring grooves .095 in. Width of oil ring groove .157 in. Piston pin diameter .750 in., length 2.985 in. Clearance of pin in piston .0005 in. maximum.

Connecting Rods

Rod bearings are full floating type with inner and outer bearing surfaces and are interchangeable. Rod and piston assemblies are removable from above.

Main Bearings

Main bearings are steel backed inserts with piloted bearing caps. Diameter 2.50 in. No shims used.

Spark Plugs

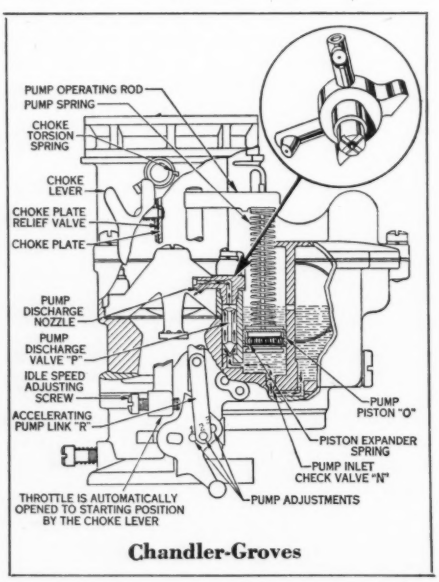
Standard equipment Champion H10, 14 mm. Set to .025 in.

Battery

Own make, 17 plate, 100 ampere hours. Height 7.1 in., width 7.2 in., length 10.5 in. Positive terminal grounded.

Generator

Own make, two brush type with regulator. Maximum output 26 amperes at 1200 engine r.p.m. Cut-out closes at 7 volts 510 engine r.p.m.



Chandler-Groves

Starter

Own make. Engine cranking speed 100 r.p.m. Maximum torque 14 ft. lb. Lock test 500 amperes.

Front Axle Data

Reverse Elliott I-beam section. Caster angle 4½ deg. to 9 deg., camber ¼ deg. to 1 deg., camber plus side inclination 8¼ deg. to 9 deg. Toe-in 1/16 in.

Steering Gear

Worm and double roller. Up and down play in worm is controlled by shims at lower housing cover. Removing shims tightens bearing. Mesh of worm and sector is controlled by screw in upper housing cover. Turning screw inward brings rollers closer to worm.

Rear Axle

Three-quarter floating with straddle mounted pinion. Pinion bearings are adjusted by means of a nut on pinion shaft. It is necessary to remove rear axle to make this adjustment. Differential bearings may be adjusted slightly by changing shims between banjo and tube flanges.

Brakes

Brakes are Lockhead Hydaulic. Wheel cylinders are step cut with larger piston acting on forward shoe. Diameters of wheel cylinder pistons are 1¼ in. front of front cylinders, 1⅛ in. front of rear cylinders, 1 in. rear of both front and rear cylinders. These dimensions provide 55 per cent braking on front wheels. To adjust brakes, turn cam on forward shoe until shoe is tightened against drum and then back off until wheel is just free of drag. Repeat on reverse shoe and then adjust brakes on other wheels in same manner. To adjust anchors, proceed as follows: Loosen anchor lock nut, apply 25 to 35 lb. pressure to pedal and turn mark on anchor down gently until shoe touches drum. Tighten lock nut, making sure that anchor is held as nut is tightened. Remove pressure from pedal and see that brake does not drag. Repeat on other brake shoes.

Lubrication

Capacity of crankcase 5 qt. Capacity of transmission 2½ lb. or pints. Capacity of rear axle 2½ lb. or pints. Use S.A.E. 90 in transmission and rear axle in cold weather and S.A.E. 140 in warm weather.

NASH-LA FAYETTE

Engine

Six cylinder L head. 3⅜ in. bore x 4⅜ in. stroke, piston displacement 234.8 cu. in. Taxable horsepower 27.34. Maximum brake horsepower 99 at 3400 r.p.m. Maximum torque 179 ft. lb. at 1200 r.p.m. Compression ratio 6.3 to 1. Compression pressure 110 lb. at cranking speed. Torque to tighten cylinder head bolts 61 to 63 ft. lb. Firing order 1-5-3-6-2-4.

Distributor

Auto-Lite model IGS-4104 with vacuum control. Maximum automatic advance 12 deg. Maximum vacuum advance 13 deg. Breaker point gap .020 in. Amperage draw of ignition coil, engine stopped, points closed 4 amp., engine idling 2½ amp.

Ignition Timing

With breaker point gap set to .020 in. spark occurs at top center or when the top center mark on vibration damper aligns with pointer.

Spark Plugs

Auto-Lite B-7-A or A-C G-9. Set gap to .023 to .027 in.

Valves

Operating tappet clearance .015 in. hot for inlet and exhaust. Same clearance for valve timing. Seat angle of valves 45 deg.

Valve Springs

Spring pressure 65 to 75 lb. at 2 in.; 111 to 118 lb. at 1 11/16 in. Free length 2½ in.

Valve Timing

With tappets set to .015 in. inlet valve opens 21½ deg. or 6¼ flywheel teeth before top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Tin plated aluminum alloy with Invar strut. Clearance at top .027 to .030 in.; at skirt .002 to .001 in. Weight 19¼ oz. Ring groove depth—oil .1855 to .1910 in. Compression .1655 to 1710 in. Number and width of rings—oil 2 5/32 in. Compression 2⅛ in. Wrist pin is full floating. Piston and rod assemblies may be removed from above.

Connecting Rods

Lower bearing is steel backed babbitt removable insert. Clearance .0015 to .0025 in. End play .008 to .012 in. Torque to tighten rod bolts 53 to 56 ft. lb. Rod and piston assemblies may be removed from above.

Main Bearings

Main bearings are steel backed babbitt. Clearance .002 in. Crankshaft end play .004 in. Main bearings may be renewed from below. Center main bearing takes crankshaft thrust. Torque to tighten main bearing bolts 67 to 70 ft. lb.

Generator

Auto-Lite third brush type with voltage regulator optional. Maximum charging rate 18 amp. Cutout relay closes at 7 to 7½ volts. Voltage regulator setting (when so equipped) 7.3 to 7.6 volts cold; 7.1 to 7.4 volts hot.

Starter

Auto-Lite with Bendix drive. Lock test 165 to 170 amp. at 5 volts. No load test 50 amp. at 6 volts. Starter pinion meshes from rear.

Starter Switch

Starter switch is operated by depressing the clutch pedal.

Battery

U.S.L. 15 plate. Capacity 95 amp. hr. at 20 hr. rate.

Front Axle Data

Caster 1½ deg. Camber ½ deg. Toe-in zero to 1/16 in. King pin slant 7 deg. Car turning radius right or left 20 ft. 4 in.

Steering Gear

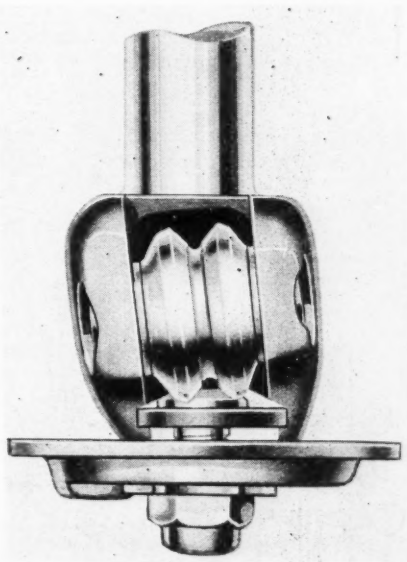
Gemmer worm and double roller integral housing type with external mash adjustment. End play in worm bearings is controlled by shims under the housing lower cover plate. Removing shims at this point will decrease end play in worm. Mesh of gear is controlled by an adjusting screw in the housing side cover plate. Remove lock nut and turn screw until backlash of gear is removed. Be sure gear does not bind on high spot.

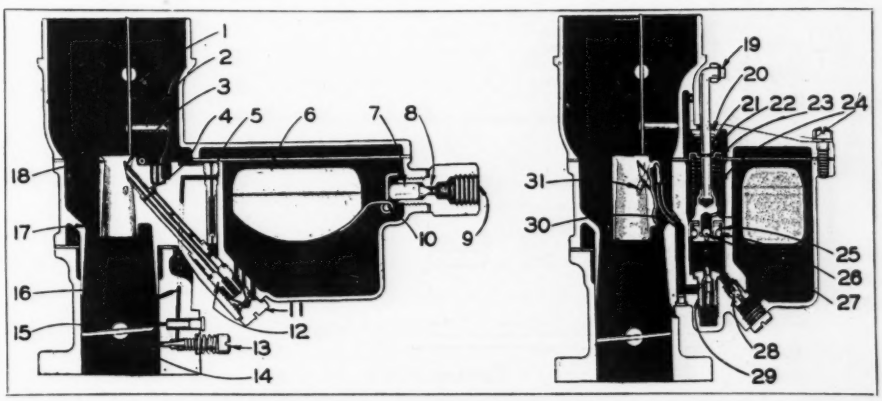
Carburetor

Stromberg Model EE-1 dual downdraft type. Idle adjustment; Idle adjusting screw controls gas, turn out for richer mixture. Float height: distance from top of fuel to top of fuel bowl should be 15/32 in. with engine idling and fuel pump pressure at 3 lb.

Brakes

Wagner Lockheed hydraulic with 10 1/16-in. drums. Clearance at toe .010 in.; at heel .010 in. Minor adjustment: Jack up wheels. Turn cam adjustment on forward shoe until wheel drags and back off until wheel is just free. Do the same to the other shoe. Repeat at all wheels. Major adjustment: Loosen anchor lock nuts. Turn cam nuts until wheel just drags. Now turn eccentric anchor in a direction which will move the bottom of the shoe down and out until wheel turns freely. Again turn cam until wheel just drags, and again turn eccentric anchor (in the same direction as previously) until the wheel is free. Continue to repeat these two operations until turning the anchor does not free the wheel and then lock the anchor in this position. Now follow the minor adjustment.





NASH

3920

Engine

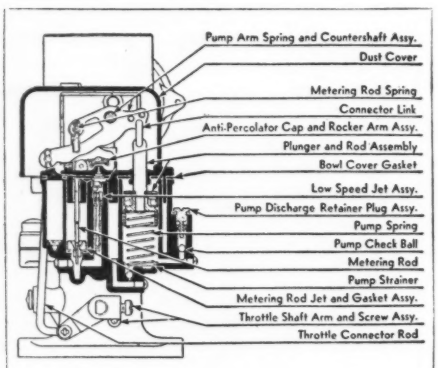
Six cylinder with overhead valves and twin ignition. 3⅜ in. bore x 4⅜ in. stroke, piston displacement 234.8 cu.in. Taxable horsepower 27.34. Maximum brake horsepower 105 at 3400 r.p.m. Maximum torque 190 ft.-lb. at 1050 r.p.m. Compression ratio 6.0 to 1. Compression pressure 125 lb. at 350 r.p.m. Torque to tighten cylinder head bolts 61 to 63 ft.-lb. Firing order 1-5-3-6-2-4.

Distributor

Auto-Lite twin ignition type. Maximum automatic advance 26 deg. Breaker point gap .020 in. Amperage draw of ignition coils 6 amp. with engine idling. Cam angle 38 deg.

Spark Plugs

A-C 45. Set gap to .023 to .027 in.



Ignition Timing

With breaker points set to .020 in. spark occurs 6 deg. before top center or when the 6 deg. mark on vibration damper aligns with pointer. Both breaker points should open simultaneously.

Valves

Operating tappet clearance .015 in., for inlet and exhaust. Same clearance for valve timing. Seat angle of valves 45 deg. Free length of valve springs 2 in. for outer spring 1 21/32 in. for inner spring.

Valve Timing

With tappets set to .015 in. inlet opens 24½ deg. before top center. This is 7 flywheel teeth before the T-C mark on vibration damper aligns with pointer. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Tin plated aluminum alloy with invar strut. Weight 19¼ oz. Clearance at top .027 to .030 in. At skirt .001 to .002 in. Number and width of rings—Oil 2 5/32 in. Compression 2⅛ in. Piston and rod assemblies may be removed from above.

Connecting Rods

Lower bearing is a steel backed babbitt removable insert. Clearance .0015 to .0025 in. End play .008 to .012 in. Torque to tighten connecting rod bolts 53 to 56 ft.-lb. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are steel backed babbitt removable inserts. Clearance .002 in. Crankshaft end play .004 in. Center main bearing takes crankshaft thrust. Main bearings may be renewed from below.

Carburetor

Carter model 435-S with Climatic Control. Float height: Distance from small projection on float bowl cover to soldered seam on float should be ⅜ in. Accelerating pump: With pump connector link set in outer hole (longest stroke) plunger should move 27/64 in. from closed to wide open throttle position. Make adjustment by bending throttle connector link at lower angle. Metering rod: Metering rod should be set with gage No. T109-102. Insert gage in place of metering pin. Now with throttle valve seated, metering rod pin should just clear notch in gage. Adjust by bending metering rod pin arm.

Generator

Auto-Lite model GDS-4802-A third brush type with current regulator. Maximum charging rate: hot 28 amp. at 8.0 volts, 3400 r.p.m.; cold 31 amp. at 8.0 volts, 3200 r.p.m. Cutout relay closes at 7.0 volts, opens at zero to 2 amperes reverse current. Regulator is set to 7.3 to 7.6 cold; 7.1 to 7.4 volts hot.

Starter

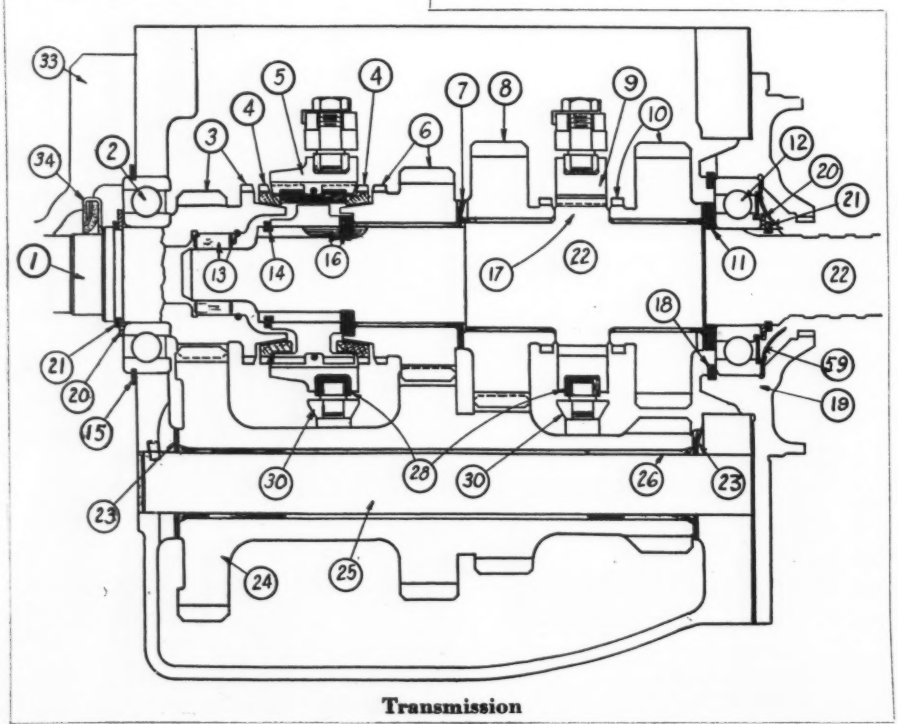
Auto-Lite model MAB-4076 with Bendix drive. Lock test 750 amp., 4.0 volts, 2 1/5 ft.-lb. torque. No load test 60 amp., 5.5 volts, 3700 r.p.m. Starter pinion meshes from rear.

Battery

U-S-L. 15 plate. Capacity 105 amp.hr. at 20 hr. rate.

Steering Gear

Gemmer worm roller integral housing type with external mesh adjustment. End play in worm bearings is controlled by the adjusting screw ing lower cover plate. Removing shims at this point will decrease end play in worm bearings. Mesh of gear is controlled by the adjusting screw in the housing side cover plate. Remove lock nut and turn adjusting screw until backlash of gear is removed. Be careful not to bind gear at the high spot.



Transmission

NASH

3980

Engine

Eight cylinder with overhead valves and twin ignition. 3⅛ in. bore x 4¼ in. stroke, piston displacement 260.8 cu. in. Taxable horsepower 31.25. Maximum brake horsepower 115 at 3400 r.p.m. Maximum torque 200 ft.-lb. at 1200 r.p.m. Compression ratio 6.0 to 1. Compression pressures 110 lb. at 350 r.p.m. Firing order 1-6-2-5-8-3-7-4. Torque to tighten cylinder head bolts 61 to 63 ft.-lbs.

Distributor

Auto-Lite model IGK-4102 twin ignition type with automatic advance. Maximum automatic advance 24 deg. Breaker point gap .020 in. Cam angle 31 deg. Amperage draw of ignition coil, engine stopped 5 amp., engine idling 2 amp.

Spark Plugs

A-C model 45. Set gap to .023 to .027 in.

Ignition Timing

With breaker points set to .020 in. spark occurs 9 deg. before top center or when ignition timing line on vibration damper aligns with pointer. Both sets of points should open simultaneously.

Valves

Operating tappet clearance .015 in. hot. Same clearance for valve timing. Seat angle of valves 45 deg. Free length of valve springs, inner 1 21/32 in., outer 2 in.

Valve Timing

With tappets set to .015 in. inlet valve opens 20 deg. or 6 flywheel teeth before top center. Marks on cam crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Tin plated aluminum alloy with invar strut. Weight 16 oz. Clearance at top .018 to .022 in.; at skirt .001 to .002 in. Number and width of rings—Oil 1⅛ and 1 3/16 in. Compression 2⅛ in. Wrist pin diameter and length ⅞ in. x 2 9/16 in. Piston and rod assemblies may be removed from below.

Connecting Rods

Lower bearing is a steel backed babbitt removable insert. Clearance .0015 to .0025 in. End play .008 to .012 in. Torque recommended to tighten rod bolts 53 to 56 ft. lbs. Rod and piston assemblies may be removed from below.

Main Bearings

Main bearings are steel backed babbitt removable inserts. Clearance .002 in. Crankshaft end play .004 in. Center main bearing takes crankshaft thrust. Main bearings may be renewed from below.

Generator

Auto-Lite model GDS-4802-B third brush type with current regulator. Maximum charging rate—Hot 28 amps at 8.0 volts, 3400 r.p.m. Cold 31 amps at 8.0 volts, 3200 r.p.m. Cutout relay closes at 7.0 volts, opens at zero to 2 amperes reverse current. Voltage regulator is set to 7.3 to 7.6 volts cold. 7.1 to 7.4 volts hot.

Starter

Auto-Lite model MAB-4054 with Bendix drive. Lock test 750 amps., 4 volts, 21.5 ft.-lb. torque. No load test 60 amps., 5.5 volts, 3700 r.p.m.

Battery

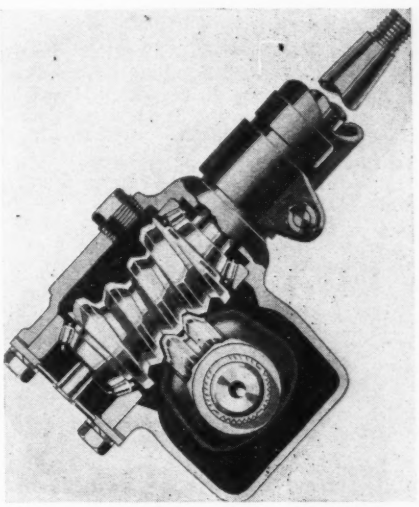
U.S.L. 17 plate. Capacity 120 ampere hours at 20 hour rate.

Carburetor

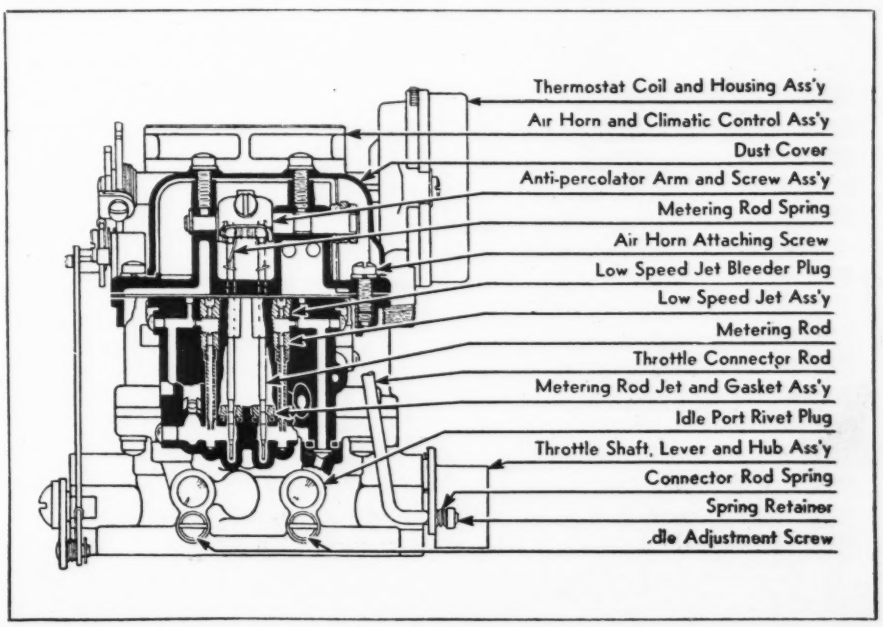
Carter model 436-S dual downdraft with Climatic Control. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Standard setting is ¼ to 1 turn open. Do not idle engine below 7 m.p.h. Metering rod: Economy step .073 in. Middle step tapers to .0695 in. Power step .0565 in. To set metering rod use gage No. T109-113 (2.280 inches). Accelerating pump: With pump connecter link in upper hole, pump plunger should travel ½ in. from closed to wide open throttle position. Adjust by bending pump to throttle arm at lower angle. Climatic Control setting is clearly marked on the housing. It is sometimes advantageous to set the Climatic Control one notch rich. Float height: Distance from top of float to machined surface of float cover should be 3/16 in. with float in raised position.

Steering Gear

Gemmer worm and double roller integral housing type with external mesh adjustment. End play in worm bearings is controlled by shim under the housing lower cover. Removing shims at this point will decrease end play in the worm bearings. Mesh of gear is controlled by the adjusting screw in the housing side cover plate. Remove acorn lock nut and turn adjusting screw until back lash of gear is removed. Be careful not to bind gear on its high spot.



Gemmer integral housing type gear



OLDSMOBILE

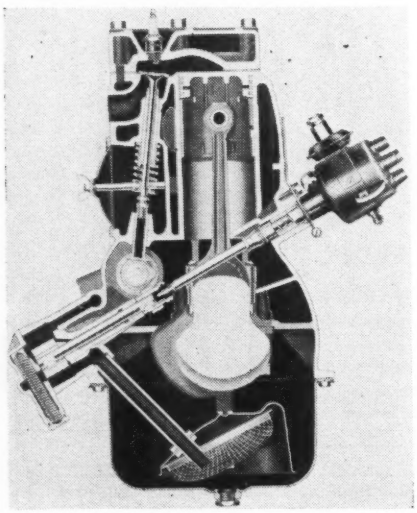
SERIES 60. 70

Engine

Series 60, 3 7/16 in. bore x 3⅞ in. stroke. Series 70, 3 7/16 in. bore x 4⅛ in. stroke. Piston displacement, Series 60, 216 cu. in. Series 70, 229.7 cu. in. Maximum brake horsepower, Series 60, 90 at 3200 r.p.m. Series 70, 95 at 3300 r.p.m. Maximum torque, Series 60, 170 ft. lb. at 1600 r.p.m. Series 70, 180 ft. lb. at 1600 r.p.m. Standard compression ratio, Series 60, 6.2 to 1. Series 70, 6.1 to 1. Optional compression ratio, Series 60, 5.67 to 1. Series 70, 5.61 to 1. Compression pressures (std. head), Series 60. 151 lb. at 1000 r.pm. Series 70, 146 lb. at 1000 r.p.m. Torque recommended to set cylinder head nuts 65 to 70 ft. lbs.

Distributor

Delco Remy single breaker point type with vacuum advance. Max. automatic advance 25 flywheel degrees Vacuum advance 34 flywheel degrees. Breaker point gap .020 in. Breaker arm spring tension 17 to 21 oz. Vacuum required to start advance, 5 to 7 inches.



Ignition Timing

With breaker points set to .020 in. and octane selector set to zero, spark occurs at top center or when the steel ball in front face of flywheel comes under pointer. Timing inspection hole is on the left front face of flywheel housing beside starter.

Valves

Operating tappet clearance—inlet .008 in., exhaust .11 in. Clearance for valve timing—inlet .0124 in., exhaust .0155 in. Seat angle of inlet valves 30 deg., exhaust valves 45 deg.

Valve Timing

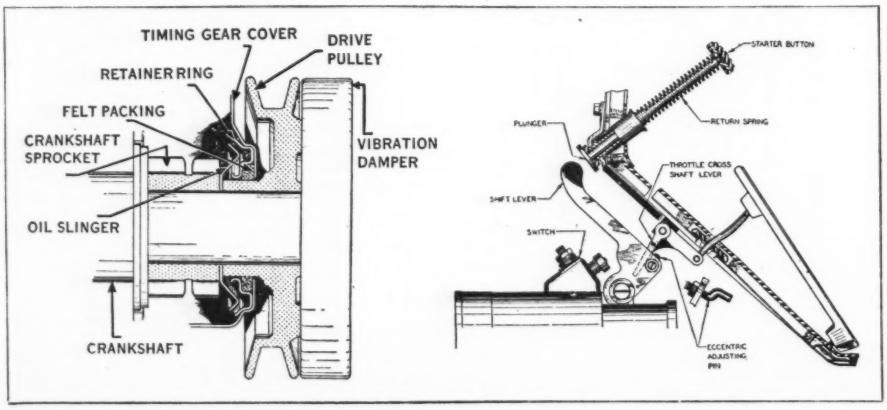
With inlet tappets set to .0124 in. and exhaust tappets set to .0155 in. inlet valve opens 5 deg. or 2 flywheel teeth before top center, exhaust valve closes 5 deg. or 2 flywheel teeth after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Own make oxide finished aluminum with T slot. Clearance at top .026 in., at skirt .0013 in. to .0018 in. Weight 17.75 oz. Depth of ring grooves—oil 3/16 in., compression 11/64 in. Width of rings—oil 3/16 in., compression 3/32 in. Ring gap—oil .007 to .015 in., compression .008 to .018 in. Piston and rod assemblies may be removed from above.

Main Bearings

Mains are steel backed babbitt removable inserts which may be renewed from below. Clearance .0005 to .003 in. Crankshaft endplay .004 to .008 in. Thrust washers are inserted at No. 1 main bearing. (If bronze and steel washers are used, steel face of thrust washer should be assembled to bearing. Torque recommended to tighten main bearing bolts is 135 to 145 ft. lb.)



Generator

Delco Remy non adjustable third brush type with voltage regulator. Maximum charging rate, cold, 26.5 to 30.5 amps. at 8.0 volts; hot, 24.6 to 28.6 amps. at 8.0 volts. Brush spring tension: Main brushes, 22 to 26 oz. Third brush, 16 to 20 oz. Cutout relay closes at 6.3 to 6.9 volts; opens at zero to 3 amperes. Voltage regulator is set to 7.4 to 7.8 volts.

Starter

Delco Remy. Lock test 475 amps., 3.0 volts, 12ft. lb. torque. No load test 65 amps., 5.0 volts, 5000 r.p.m. Starter pinion meshes from front. Normal engine cranking speed (summer) 100 r.p.m.

Steering Gear

For adjustment of steering gear see EIGHT CYLINDER model.

Transmission Disassembly

(Synchro-mesh transmission)

Disconnect the lower control rod at transmission. Disconnect selector cable from cable bracket on transmission and unscrew cable from end of selector shaft and remove selector shaft lever and helper springs. (It is important that the above parts be removed in the order named so as not to damage the selector cable.) Remove transmission from car. Remove transmission cover. Remove speedometer gear. Unscrew four capscrews at rear of case and remove rear bearing housing. Remove set screws from shifter forks and selector shaft cams and withdraw selector shaft through side of case (do not drop cams into transmission case). Note: The second and high shifter cam is shorter than the low and reverse cam. Now remove shifter rails and forks.

CAUTION: The poppet balls and springs are underneath the rails and care must be exercised to avoid losing them. It is best to remove the rails through front of case.

Remove low and reverse gear and sleeve. Remove countershaft through rear of case (let gear cluster fall to bottom of case). Remove main drive gear snap ring and withdraw main drive gear. Lift out countershaft gear cluster. Remove idler shaft set screw, idler shaft and idler gear. Second speed gear is held to mainshaft by snap ring. Reassemble in reverse order. NOTE: When assembling selector cable to transmission, make sure that cable is properly installed. This requires the use of tool No. J-1066, which will accurately locate the cable bracket.

Spark Plugs

A-C 45. With gap set to .040 in.

OLDSMOBILE

SERIES 80

Engine

Own, L head. 3¼ in. bore x 3⅞ in. stroke, piston displacement 257.1 cu. in. Max. brake horsepower 110 at 3500 r.p.m. Max. torque 200 ft. lbs. at 1800 r.p.m. Compression ratio standards 6.2 to 1; optional 5.8 to 1. Compression pressure standard 152 lbs. at 1000 r.p.m. Torque required to set cylinder head studs 65 to 70 ft. lbs. Firing order 1-6-2-5-8-3-7-4.

Distributor

Delco-Remy single breaker point type with vacuum advance. Max. automatic advance 27.5 deg. Vacuum advance 33 deg. Breaker point gap .015 in. Breaker arm spring tension 19 to 23 oz. Vacuum required to start vacuum advance 5 to 7 inches. Distributor cam rotates in a counter clockwise direction.

Ignition Timing

With breaker point set to .015 in. and hold down plate set to zero, spark occurs 4 degrees before top center or when the steel ball in flywheel aligns with pointer. Timing inspection hole is located on the left front face of the flywheel housing beside starter.

Valves

Operating tappet clearance inlet .008 in. exhaust .011 in. Seat angle of inlet valves 30 deg.; exhaust valves 45 deg. Stem to guide clearance .002 to .004 in.

Valve Springs

Spring pressure 46 lbs. at 2 9/32 in.; 94 lbs at 1 31/32 in. Free length 2⅝ in. Split cone keepers used.

Valve Timing

With inlet tappet set to .008 in. and exhaust tappets set to .011 in., inlet valve opens at top center, exhaust closes 10 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and on line between shaft centers. Inlet valve should open 1½ to 2 flywheel teeth after the steel ball in flywheelface.

Pistons

T slot aluminum pistons with oxide finish. Clearance at top .026 in.; at skirt .0013 to .0018 in. Oil ring groove depth 5/32 in. Compression ring groove depth 9/64 in. Width of oil rings 3/16 in. Width of compression rings 3/32 in. Piston weight 16 oz. Rod and piston assemblies may be removed from above.

Connecting Rods

30 to 35 ft. lbs. torque should be used to tighten connecting rod bolts. Rod and piston assemblies may be removed from above.

Main Bearings

Steel backed babbitt removable inserts. Clearance .001 to .003 in. Crankshaft endplay .004 to .008 in. Front bearing is equipped with thrust washers. When assembling steel backed thrust washers the steel side of each washer should be placed against the face of the bearing cap. 135 to 145 ft. lbs. torque should be applied to tighten main bearing bolts.

Carburetor

Carter model 389-S dual downdraft type with Climatic Control. Float height: Distance from machined surface of float bowl cover to top of float (not soldered seam) should be 9/32 in. with float in raised position. Adjust by bending lip which contacts float needle. Accelerating pump: Pump plunger travel is 19/64 in. from closed to wide open throttle position with link set in inner (lean) hole. Metering rod: Insert metering rod gage No. J-1135 in place of metering rod, put metering rod pin in pump link, close throttle and push piston link down until metering rod pin seats in notch in gage, in this position, clearance between lip on anti-percolater and the metering rod arm should be less than .005 in. Adjust by bending lip on anti-percolater arm. Idle adjusting screw controls gas, turn out for richer mixture.

Generator

Delco-Remy third brush type with voltage regulator. Max. charging rate, hot 24.6 to 28.6 amps. at 8.0 volts; cold 26.5 to 30.6 amps. at 8 volts. Cutout relay closes at 6.3 to 6.9 volts, opens at 0 to 3 amps. Voltage regulator is set to 7.5 volts hot. Third brush is not movable.

Steering Gear

Saginaw worm and roller with eccentric sleeve. Worm endplay is adjusted at the large adjusting screw located at the end of the worm housing. Cross shaft endplay is adjusted at the adjusting screw in the gear cover. Adjust in the following order—Cross shaft end—play, worm endplay, and mesh of gear.

Front Axle

Caster 0 to ¾ deg. negative. Camber ⅛ deg. to 1 deg. King pin slant 4 deg. 51 min. 10 sec. Toe-in ⅛ to 3/16 in. Both caster and camber are adjusted at the eccentric pin in the upper control arm outer end. Camber is adjusted within ½ turn of the correct caster adjustment. To adjust toe-in, turn both tie rods an equal amount in the same direction.

Spark Plugs

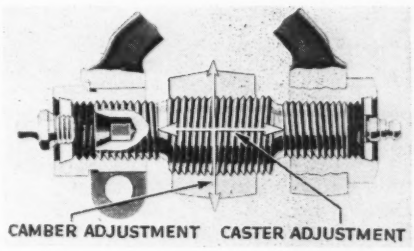
A-C 45 with gap set to .030 in.

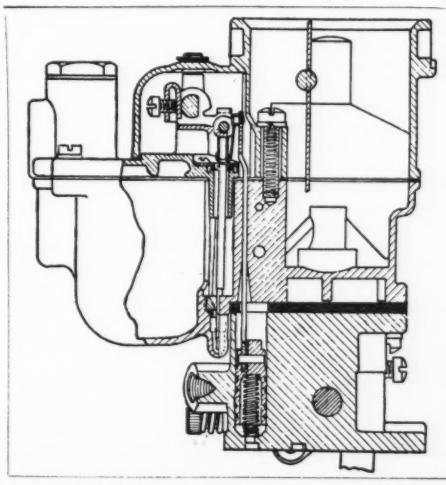
Starter

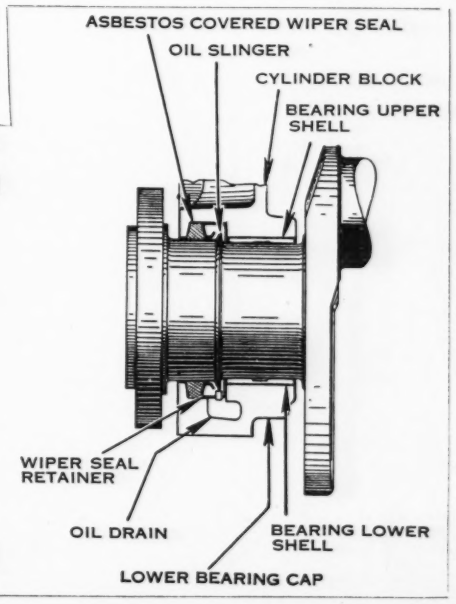
Delco Remy. Lock test 600 amps., 3.0 volts, 15 ft. lbs. torque. No load test 60 amps., 5.0 volts, 6000 r.p.m. Normal engine cranking speed (summer) 100 r.p.m.

Battery

Delco 17 plate. Capacity 115 ampere hours at 20 hour rate.







OVERLAND

MODEL 39

Engine

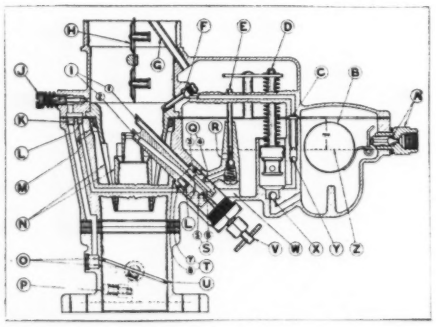
Four cylinder L head. No. 1⅛ in. bore x 4⅜ in. stroke, piston displacement 134.2 cu. in. Taxable horsepower 15.63. Maximum brake horsepower 61 at 3600 r.p.m. Maximum torque 106 ft. lbs. at 2200 r.p.m. Compression ratio 6.35 to 1 standard; 6.81 to 1 optional. Compression pressures 105 lbs. at 185 r.p.m. with standard head. Torque to tighten cylinder head bolts—70 to 74 ft. lbs. on cast iron heads; 39 to 42 ft. lbs. on aluminum heads. Firing order 1-3-4-2.

Distributor

Auto-Lite model IGS-4007-B with vacuum control. Maximum automatic advance 18 to 20 degrees. Vacuum advance 13 to 15 degrees. Breaker point gap .020 in. Cam angle 47 degrees. Amperage draw of ignition coil 4 amperes with engine stopped and points closed, 2.5 amperes with engine idling.

Spark Plugs

Champion J-8. Set gap to .025 in.



Ignition Timing

With breaker points set to .020 in. spark occurs at top center or when the top center mark on flywheel aligns with pointer. Timing inspection hole is located in the left front face of flywheel housing.

Valves

Operating tappet clearance inlet .014 in. exhaust .016 in. cold. Clearance for valve timing inlet and exhaust .020 in. Seat angle of valves 45 degrees. Valve stem clearance .0015 to .00325 in.

Valve Springs

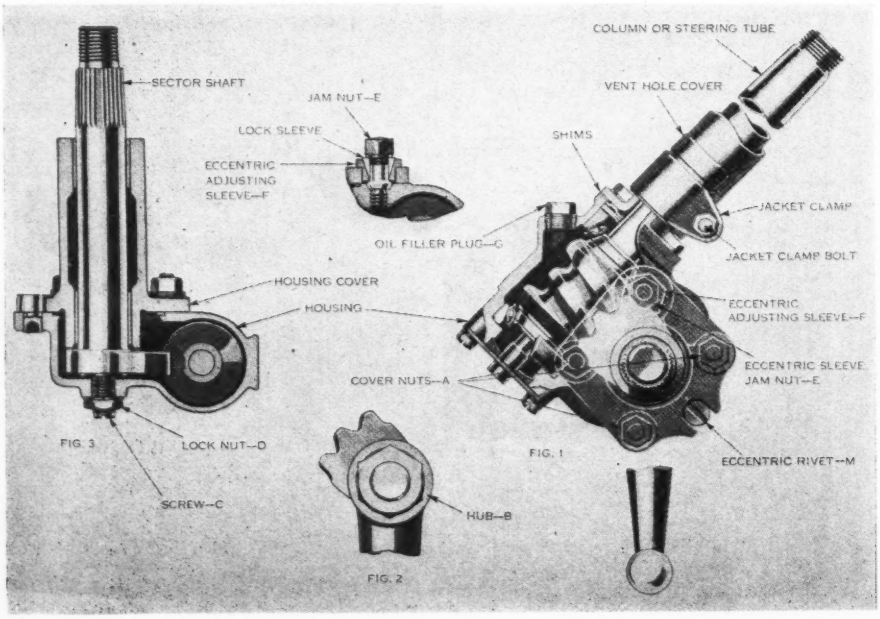
Spring pressure 59.5 lbs. at 2.165 in.; 100 lbs. at 1.814 in. Free length 2.684 in.

Valve Timing

With inlet and exhaust tappets set to .020 in. inlet valve opens 9 degrees or 2½ flywheel teeth before top center. (.039 in. piston travel before top center.) Exhaust closes 12 degrees or 3¼ flywheel teeth after top center. (.054 in. piston travel after top center.) Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Cam ground, tin plated aluminum alloy. Weight 12 ozs. Clearance at skirt .002 to .0025 in. Ring groove depth—Oil .170 in.; Compression .160 in. Number and width of rings—Oil rings 1-3/16 in. Compression rings 2-3/32 in. Piston and rod assemblies may be removed from above.



Connecting Rods

Rod bearings are spun in babbitt. No shims are used. Clearance .001 to .0025 in. End play .005 to .009 in. Wrist pin is locked in rod. Rod and piston assemblies may be removed from above.

Main Bearings

Main bearings are steel backed babbitt inserts. Clearance .001 to .0025 in. Crankshaft end play .004 to .006 in. Crankshaft thrust is taken on No. 1 main bearing. To renew bearings it is necessary to remove engine.

Carburetor

Tillotson model U-1B single downdraft. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Approximately correct setting of idle adjusting screw is one turn open. Idle engine so that in high gear car will travel 7 m.p.h. Main adjustment: Thoroughly warm engine, set hand throttle for engine speed equivalent to 30 to 35 m.p.h. Now turn main adjusting screw to the right or in until engine slows down for lack of fuel. Next turn adjusting screw in the opposite direction or out very slowly until engine reaches its maximum speed. Now turn in ⅜ of one turn which will give the correct setting. (Correct setting is approximately 2⅜ turns open.) Fuel height: Level of fuel in float bowl should be ¾ in. below top of float bowl.

Generator

Auto-Lite model GBM-4811-A on Standard models, GCJ-4811-A on De-Luxe models. Both third brush types. Voltage regulator is used on the De-Luxe models. Maximum charging rate cold 18 amperes at 8.0 volts. Cutout relay closes at 7 to 7.5 volts, opens at zero to 2.5 amperes reverse current. Voltage regulator is set to 7.3 to 7.6 volts cold, 7.1 to 7.4 volts hot.

Starter

Auto-Lite model MZ-4064 with Bendix drive. Lock test 400 amperes, 4.0 volts, 11.8 ft. lbs. torque. No load test 70 amperes, 5.5 volts, 4300 r.p.m. Starter pinion meshes from front.

Battery

U.S.L. 13 plate. Capacity 78 ampere hours at 20 hour rate.

Starter Switch

Auto-Lite model SS-4001 solenoid type operated by a push button switch on dash.

PACKARD

SIX. MODEL 1700

Engine

Six cylinder L head. 3½ in. bore by 4¼ in. stroke. Piston displacement 245.3 cu. in. Taxable hp. 29.4. Maximum brake hp. 100 at 3200 r.p.m. Compression ratio—standard 6.52 to 1, optional 6.85 to 1. Firing order 1-5-3-6-2-4. Torque to tighten cylinder head bolts 53 to 60 ft. lb.

Distributor

Auto-Lite model IGS-4013 with vacuum control. Maximum automatic advance 17½ deg. Vacuum advance 15 deg. Breaker point gap .022 in. Cam angle 38 deg. Amperage draw of ignition coil—Engine stopped 5 amp., engine idling 2 amp.

Spark Plugs

A-C 103 or Champion Y-4. Set gap to .025-.030 in.

Ignition Timing

With breaker point set to .022 in. and fuel selector set to zero spark occurs 6 deg. or three lines on flywheel before top center with standard head. Spark occurs 4 deg. or two graduations on flywheel before top center with high compression head. Automatic spark advance begins at 600 r.p.m. of engine.

Valves

Operating tappet clearance — inlet .007 in., exhaust .010 in. Tappet clearance for valve timing—inlet .012 in., exhaust .015 in. Seat angle of valves —inlet 30 deg., exhaust 45 deg. Valve spring pressure 50 lb. at 1⅝ in., 120 lb. at 1 5/16 in.

Valve Timing

With inlet tappets set to .012 in. and exhaust tappets set to .015 in. inlet opens 1 deg. before top center, or one half of one graduation on flywheel before top center. Exhaust closes 5 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Aluminum alloy with strut. Weight 19½ oz. Clearance at skirt .001 in. Depth of ring grooves—oil .161 in., compression .1835 in. Number and width of rings—oil 1, .1865 in.; compression 2, .124 in. Piston and rod assemblies may be removed from above.

Connecting Rods

Lower bearing is a babbitt-lined insert. Clearance .0005 to .0015 in. End play .004 to .010 in. Assemble in motor with oil hole towards camshaft. Rod and piston assemblies may be removed from above.

Main Bearings

Main bearings are steel backed babbitt removable inserts which may be renewed from below. Clearance .001 to .003 in. Crankshaft end play .003 to .008 in. Crankshaft thrust is taken on No. 1 main bearing.

Carburetor

Chandler-Groves single downdraft. Idle adjustment: Idle adjusting screw controls gas, turn out for richer mixture. Accelerating pump: Accelerating pump link is normally set in the center hole in throttle lever. To secure maximum accelerating charge set link in outer hole. Float height: Distance from top of float to top of float chamber should be 3/16 in. with float in raised position. Level of fuel should be ½ in. below top of float bowl.

Generator

Auto-Lite model GCJ-4807-A-2 third brush type with voltage regulator. Maximum charging rate, cold 30 amp. 8.0 volts, 3200 r.p.m.; hot 26 amp., 8.0 volts, 3600 r.p.m. Cutout relay closes at 7.0 volts, opens at zero to 2 amp. reverse current. Voltage regulator is set to 7.1 to 7.4 volts hot; 7.3 to 7.6 volts cold.

Starter

Auto-Lite model MAW-4018 with Bendix drive. Lock test 670 amp., 4.0 volts, 18 ft. lb. torque. No load test 65 amp., 5.5 volts, 4900 r.p.m. Normal engine cranking speed 125 r.p.m.

Starter Switch

Auto-Lite model SS-4001-A solenoid type, operated by a push button switch on dash.

Battery

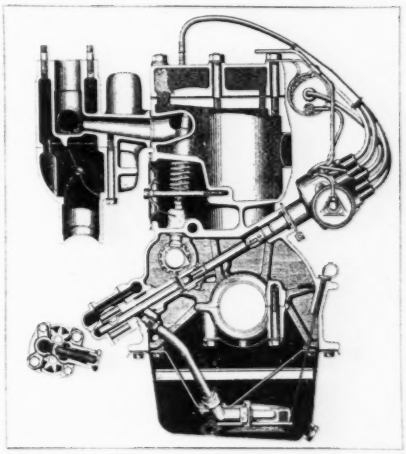
Willard 15 plate. Capacity 95 amp. hr. at 20-hr. rate.

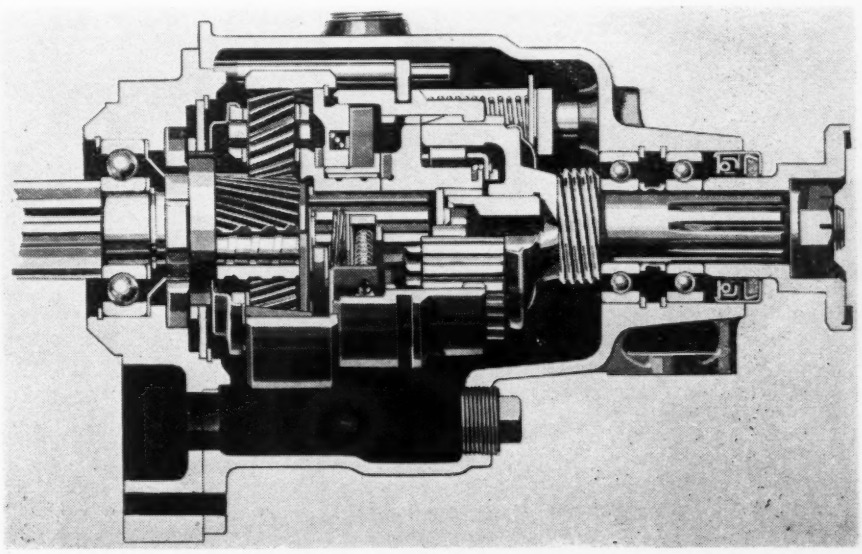
Steering Gear

Own make worm and double roller integral housing type. End play in worm bearings is controlled by shims under the housing lower cover plate. Removing shims at this point will decrease end play in the worm bearings. End play in the cross shaft is controlled by an adjusting screw in the housing side cover plate. Mesh of gear is controlled by shims between the roller tooth and the inner side of the housing. To add or remove shims at this point it is necessary to remove the cross shaft. Removal of shims will decrease backlash of gear.

Front Suspension Data

Caster 1½ deg. plus or minus ½ deg. Camber ½ deg. plus ¾ deg. minus 0 deg. King pin slant 1 deg. 54 min. Toe-in zero to 1/16 in.





PACKARD

EIGHT, MODELS 1701. 1702

Engine

Eight cylinder L head 3¼ in. bore x 4¼ in. stroke, piston displacement 282.0 cu. in. Taxable hp. 33.8. Maximum brake hp. 120 at 3600 r.p.m. Compression ratio 6.41 to 1 standard; 6.85 to 1 optional. Firing order: 1-6-2-5-8-3-7-4. Torque to tighten cylinder head bolts 53 to 60 ft. lbs.

Distributor

Auto-Lite model IGT-4007-A single breaker point type with vacuum control. Maximum automatic advance 17½ deg. Vacuum advance 12 deg. Cam angle 31 deg. Breaker point gap .015 in. Amperage draw of ignition coil 5 amp. engine stopped; 2 amp. engine idling.

Battery

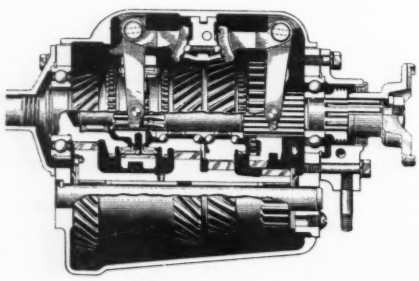
Prest-O-Lite or Delco 17 plate. Capacity 114 amp. hr. at 20-hr. rate.

Spark Plugs

A-C 103 or Champion Y-4. Set gap to .025 to .030 in.

Ignition Timing

With breaker points set to .015 in. and fuel compensator set to zero spark occurs 8 deg. or four flywheel graduations before top center with standard head. With optional head, spark occurs 4 deg. or two flywheel graduations before top center.



Transmission

Valves

Operating tappet clearance inlet .002 in., exhaust .004 in., hot. Tappet clearance for valve timing inlet .007 in., exhaust .010 in. Seat angle of valves, inlet 30 deg., exhaust 45 deg. Valve spring pressure 50 lbs. at 1⅝ in.; 120 lbs. at 1 5/16 in.

Valve Timing

With inlet tappets set to .007 in. and exhaust tappets set to .010 in. inlet valve opens 1 deg. before top center or midway between the top center mark and the first flywheel graduation before top center. Exhaust closes 5 deg. after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Aluminum alloy with strut. Weight 16⅞ oz. Clearance at skirt .001 in. Depth of ring grooves—oil .1562 in., compression .1787 in. Number and width of rings—oil 1, .186 in.; compression 2, .1240 in. Piston and rod assemblies may be removed from above. When assembling pistons to engine, slot should face camshaft.

Connecting Rods

Rod bearings are babitt lined removable inserts. Clearance .0005 to .0015 in. End play .004 to .010 in. Assemble in engine with oil hole towards camshaft. Rod and piston assemblies may be removed from above.

Generator

Auto-Lite model GCJ-4807-A-2 third brush type with voltage regulator. Maximum charging rate: Cold, 30 amp., 8.0 volts, 3200 r.p.m.; hot, 26 amp., 8.0 volts, 3600 r.p.m. Cutout relay closes at 7.0 volts, opens at zero to 2 amp. reverse current. Voltage regulator is set to 7.3 to 7.6 volts cold, 7.1 to 7.3 volts hot.

Starter

Auto-Lite model MAW-4018 with Bendix drive. Lock test 670 amp. at 4.0 volts, 18 ft. lb. torque. No load test 65 amp. at 5.5 volts, 4900 r.p.m. Normal engine cranking speed 125 r.p.m.

Starter Switch

Auto-Lite model SS-4001-A solenoid type switch operated by a push button switch on dash.

Front Suspension Data

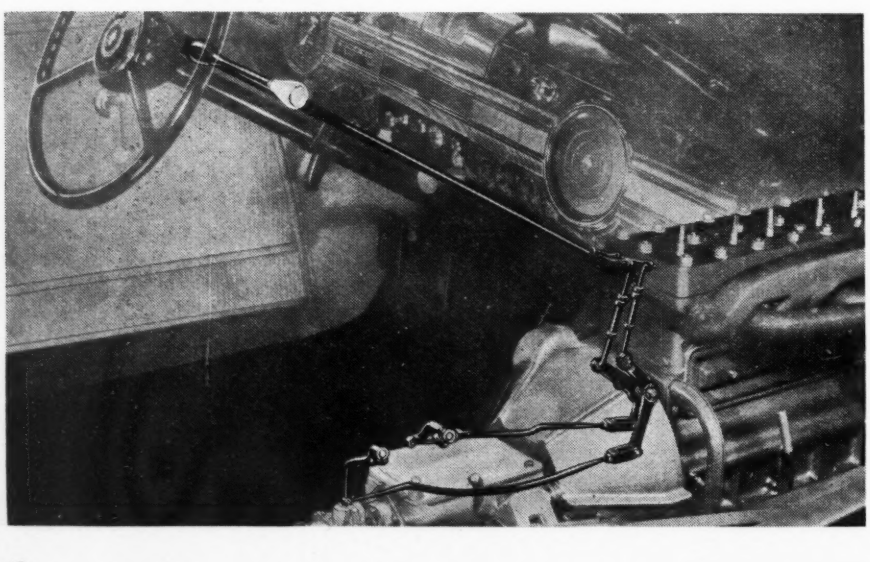
Caster 1½ deg. plus or minus ½ deg. Caster is adjusted with tapered shims at the end of the torque arm. Camber ½ to 1¼ deg. (½ deg. prefered). Camber is controlled by pilots in the elongated holes in the upper control arms. King pin slant 1 deg. 54 min. Toe-in zero to 1/16 in. (zero prefered). To set toe-in, set intermediate steering arm in a central position and adjust tie rods until they are equal in length. Now turn both tie rods an equal amount until correct toe-in is obtained. Car turning radius model 1701A, 21½ ft. model; 1702, 26½ ft.

Steering Gear

Own make worm and double roller integral housing type. End play in worm bearings is controlled by shims under the housing lower cover plate. Removing shims at this point will decrease end play in worm. End play in cross shaft is controlled by an adjusting screw in the housing side plate. Mesh of gear is controlled by shims between the roller tooth and the inner side of the housing. To add or remove shims at this point it is necessary to remove cross shaft.

Brakes

Bendix hydraulic with 12-in. drums. Minor adjustment: Jack up wheels. Loosen eccentric adjustment lock nut at the secondary shoe. Turn eccentric adjuster until a .010-in. feeler gage is just gripped between the lining and drum at the secondary shoe. Do the same to the other wheels. Now expand shoes by turning the wheel adjuster (located oposite the anchor) until wheel can just be turned by hand. Now adjust hand brake cable so that pin just enters clevice. Now back off notched wheel adjuster until wheel turns freely. Equalize brakes by loosening the notched adjuster wheel at the tight brake. Major adjustment: Loosen anchor lock nut and insert a .010-in. feeler at the anchored end of the secondary shoe. Tap the anchor outward until the feeler gage is just gripped, then tighten the anchor lock nut very tightly. Now proceed with a minor adjustment.



PLYMOUTH

MODELS P-7, P-8

Engine

Own six-sylinder L head. 3⅛ in. bore x 4⅜ in. stroke, piston displacement 201.3 cu. in. Maximum brake horsepower 82 at 3600 r.p.m. with standard head; 86 at 3600 r.p.m. with high compression head. Compression ratio 6.7 to 1 with standard head; 7.0 to 1 with high compression head. Compression pressures 140 to 150 lbs. at 1000 r.p.m. with standard head; 150 to 160 lbs. at 1000 r.p.m. with high compression head. Firing order 1-5-3-6-2-4. Torque recommended to tighten cylinder head—nuts 50 to 55 ft. lbs.; cap screws 60 to 65 ft. lbs.

Distributor

Auto-Lite single breaker point type with vacuum control. Breaker point gap .020 in. Breaker arm spring tension 18 to 20 oz. Vacuum required to start advance mechanism 5 in. at diaphragm.

Ignition Timing

With breaker points set to .020 in. and distributor indicator set to zero, spark occurs at top center or when the zero mark on the vibration damper aligns with pointer. Factory recommends that spark be timed, within a range of 4 degrees before top center to 4 degrees after top center, so that a slight ping is audible when accelerating with wide open throttle from 10 m.p.h. in high gear.

Valves

Operating tappet clearance inlet .006 in. exhaust .008 in. hot. Clearance for valve timing inlet .011 in. exhaust .013 in. Seat angle of valves 45 degrees.

Valve Springs

Spring pressure 77 to 83 lbs. compressed to 1 7/16 in. 34 to 38 lbs. compressed to 1¾ in.

Valve Timing

With inlet tappets set to .011 in. and exhaust tappets set to .012 in. inlet opens 6 degrees after top center or when the 6 degree mark on vibration damper aligns with pointer. Exhaust closes 8 degrees after top center. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Pistons

Anodice surfaced aluminum alloy, cam ground, with T slot. Clearance at top .021 in., at skirt (at maximum diameter) .0001 to .0011 in. Ring groove depth—Oil .171 in., Compression .151 in. Piston ring width—Oil 5/32 in., Compression ⅛ in. Rod and piston assemblies may be removed from above.

Connecting Rods

Lower bearing is Steel backed babbitt, removable, precision insert. Clearance .0005 to .0025 in. Endplay .0055 to .0115 in. Rod bearings are supplied by the factory in .002 in., .010 in. and .012 in. undersize. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are steel backed babbitt removable precision inserts. Mains may be renewed from below. (To remove No. 1 main, remove the timing case cover and screw between the timing case oil plate and front main bearing cap which will permit the removal of the front cap.) Bearing clearance .001 to .002 in. Crankshaft endplay .003 to .007 in.

Carburetor

Carter model D6A1 single downdraft. Float height: Distance from top to float to machined top of float bowl should be 5/64 in. plus or minus 1/64 in. Idle adjustment: Idle adjusting screw controls gas, turn screw out for richer mixture. Standard setting is ½ to 1¼ turns open. Do not idle engine below 300 r.p.m. (6 m.p.h.) Accelerating pump: Delayed action type. Pump arm has 3 holes, set link in inner (short stroke) hole in hot weather, center hole in normal weather and outer hole for cold weather or to secure greatest accelerating charge.

Generator

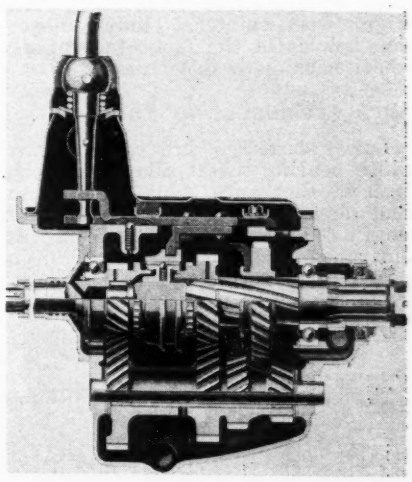
Auto-Lite movable third brush type. Maximum charging rate 18 amps. at 8.3 volts. Model P8-Auto-Lite movable third brush type with vibrating voltage regulator. Maximum charging rate cold 28 to 32 amps. at 8 volts. Hot 26 to 29 amps. at 8 volts. Voltage regulator is set to 7.1 to 7.7 volts hot, 7.1 to 7.4 volts cold. Cut-out relay points should open at not more than 2½ amps. reverse current.

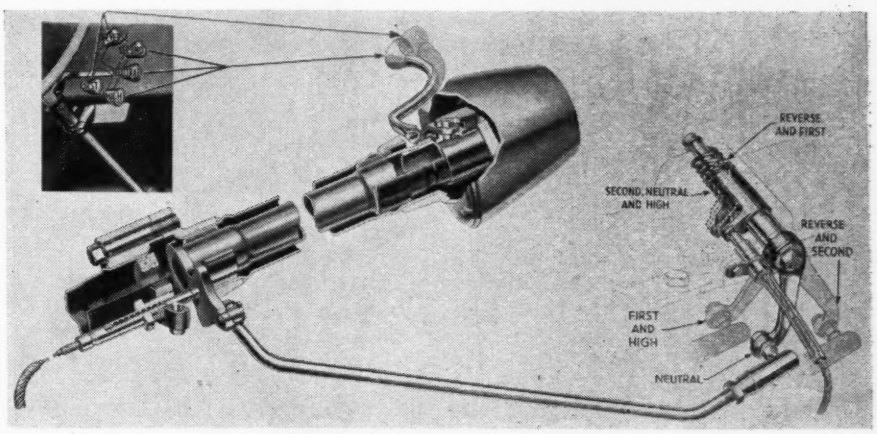
Transmission Control (Model P8)

Adjust gear shift control rod as follows: 1. Remove control rod from shift lever at transmission. 2. Set transmission in neutral and set shift lever (at top of steering column) in the neutral position. 3. Move transmission lever about ⅛ in. toward rear of car (to remove free play) and adjust control rod so that it freely enters transmission lever. Adjust gear selector cable as follows. Loosen clamp screw which holds cable at the steering column end. 2. Set gearshift lever in the neutral position. 3. Turn cable sleeve screw at the bottom of the steering column until a slight play is felt in the cable. Now turn sleeve screw just enough to remove the play. Tighten clamp screw.

Battery

Willard 13-plate. Capacity 90 ampere hours at 20-hour rate.





PONTIAC

MODELS 39-25. 39-26

Engine

Starting Serial Number 6EB-1,001. Own L head. 3 7/16 in. bore x 4 in. stroke piston displacement 222.7 cu. in. Compression ratio 6.2 to 1. Compression pressure 140 to 143 lbs. at 1000 r.p.m. Maximum brake horsepower 85 at 3520 r.p.m. Maximum torque 161 ft. lbs. at 1600 r.p.m. Engine turns 3210 r.p.m. at 60 m.p.h. with standard rear axle ratio and standard tires.

Distributor

Delco-Remy model 647D single breaker type. Maximum automatic advance 23 to 28½ flywheel. Vacuum advance 15 deg. (on flywheel). Cam angle 37 deg. Breaker point gap .018 to .024 in. Breaker arm spring tension 17 to 21 oz. measured at right angles to the contact surface. 7 to 9 inches of vacuum are required to start vacuum advance.

Ignition Timing

With breaker points set to .021 in. spark occurs 2 to 6 degrees before top center or when the range between the 2 and 6 degree mark on flywheel aligns with pointer. Timing inspection hole is in the front face of flywheel housing beside starter.

Connecting Rods

Lower bearings are steel backed white bearing metal alloy removable inserts. Clearance .0005 to .0015 in. End play .005 to .010 in. Wrist pin length 3 1/16 in., diameter 15/16 in. Clearance .0003 to .0005 in. Pin is locked in piston. Rod and piston assemblies may be removed from above.

Valves

Seat angle of inlet valves 30 deg., exhaust valves 45 deg. Operating tappet clearance .011 to .013 in hot and running. Clearance for valve timing .015 in.

Valve Springs

Spring pressure 54½ lbs. at 1 29/32 in.; 96 lbs at 1 19/32 in. Free length inlet springs 2 9/16 in.; exhaust springs 2⅜ in. Split cone keeper used.

Valve Timing

With tappets set to .015 in. inlet valve opens 5 degrees before top center or just after the 6 degree mark on flywheel aligns with pointer.

Pistons

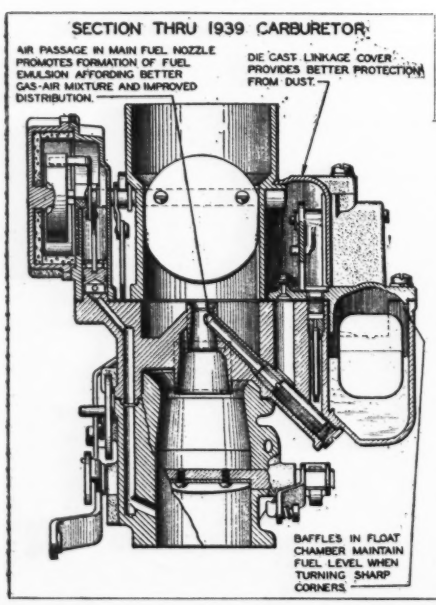
Chrome nickle iron, tin plated. Clearance at top .015 to .027 in.; at skirt .002 in. Piston length 3 37/64 in. Weight 26, 68 oz. Oil ring groove depth .189 in.; Oil ring width .1860-.1865 in. Compression ring groove depth .169 in. Compression ring width .0930-.0935 in. Ring gaps Oil—.007 to .017 in. Compression .009 to .014 in. Rod and piston assemblies may be removed from above.

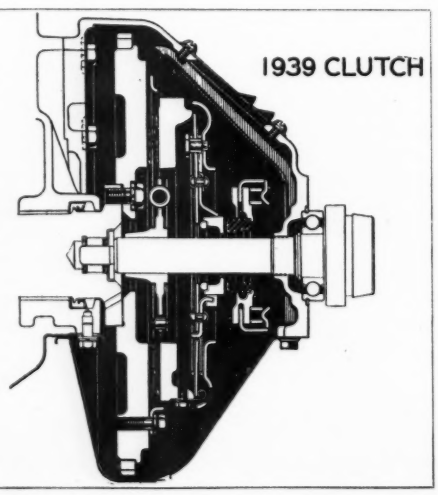
Main Bearings

Steel backed white bearing metal alloy removable inserts. Mains may be removed from below without disturbing clutch. Clearance .001 to .003 in. Crankshaft endplay .003 to .008 in. Rear center bearing takes crankshaft thrust.

Carburetor

Carter model 433S single downdraft with Climatic Control. Idle adjusting screw controls gas, turn out for richer mixture. Standard setting is ½ to 1¼ turns open. Idle engine to equivalent of 7 m.p.h. Accelerating pump arm has two holes, set link in inner hole to secure least accelerating charge. Standard setting is in inner hole. Pump plunger should move 15/64 in. from closed throttle to wide open throttle with link in inner hole. Float height: There should be ½ in. between top of soldered seam on float to top of float bowl with float in raised position. Change setting by bending lip on float slightly. Set metering rod with gage No. T109-102. Climatic Control setting is marked on the housing.


SECTION THRU 1939 CARBURETOR
AIR PASSAGE IN MAIN FUEL NOZZLE PROMOTES FORMATION OF FUEL EMULSION AFFORDING BETTER GAS-AIR MIXTURE AND IMPROVED DISTRIBUTION.
DIE CAST LINKAGE COVER PROVIDES BETTER PROTECTION FROM DUST.
BAFFLES IN FLOAT CHAMBER MAINTAIN FUEL LEVEL WHEN TURNING SHARP CORNERS.



Generator

Delco-Remy model 1,100,003 third brush type with voltage regulator. Max. charging rate cold—26 to 30 amps. at 8 volts, 3400 r.p.m. Hot—25 to 28 amps. at 8 volts 3600 r.p.m. Max. charge is secured at 42 m.p.h. in high gear. Cutout relay closes at 7.0 to 7.5 volts, opens at zero to 3 amps. Voltage regulator is set to 7.45 to 7.55 volts hot. Decreasing spring tension at voltage regulator armature will decrease voltage setting.

Steering Gear

Saginaw worm and roller with eccentric sleeve. Steering gear ratio 19 to 1. Car turning radius right 37 ft. 10 in. Left 37 ft. 5 in. Caster ¾ deg. to 1¼ deg. Camber ¾ to 1¼ deg. King pin slant 4 deg. 51 min. Toe-in 0 to 1/16 in. Caster and camber are corrected at the eccentric pin in the upper control arm outer end. Toe-in is corrected by turning both tie rods an equal amount in the same direction. See eight cylinder model for adjustment of gear.

Transmission Disassembly

Remove unit from car. Remove cover. Remove selector shaft, shifter shaft and forks. Caution, see that poppet balls and springs, which are below shifter shafts, do not fall into transmission case. Unbolt rear bearing retainer cap and remove rear bearing and shaft as a unit. Drive countershaft out through rear of case permitting countershaft gears to fall to bottom of case. Remove snap ring from front bearing and tap main drive gear into case, then lift out through top of case. Lift out countershaft gear and thrust washers. Remove over center spring anchor screws from lower left side of case which will permit the removal of the idler shaft and gear. Synchronizing drums are removed by expanding the snap ring retainers. Assemble transmission in reverse order.

PONTIAC

MODEL 39-28

Engine

Own L head, 3¼ in. bore x 3¾ in. stroke. Piston displacement 248.9 cu. in. Compression ratio 6.2 to 1. Compression pressure 140-143 lb. at 1000 r.p.m. Maximum b.hp. 100 at 3700 r.p.m. Maximum torque 173 ft. lb. at 1600 r.p.m Engine turns 3210 r.p.m at 60 m.p.h. with standard rear axle ratio and standard tires

Distributor

Delco Remy model 663X single breaker point type. Maximum automatic advance 22.5 to 28 deg. Vacuum advance 20 deg. Breaker point gap .0125 to .0175 in. Breaker arm spring tension 19-23 ounces. Cam angle 31 deg.

Ignition Timing

With breaker points set to .015 in. spark occurs 2 to 6 deg. before top center or when the range between the 2 and 6 deg. mark on the flywheel aligns under pointer at left side of flywheel housing beside starter.

Valves

Operating tappet clearance .011 to .013 in. hot and running. Clearance for valve timing .015 in. Seat angle of inlet valves 30 deg., exhaust valves 45 deg.

Valve Springs

Spring pressure 54½ lb. at 1 29/32 in.; 96 lb. at 1 19/32 in. Free length 2 9/16 in. Split cone keeper used.

Valve Timing

With tappets set to .015 in. inlet valve opens 5 deg. before top center or just after the 6 deg. mark on flywheel aligns with pointer.

Pistons

Piston material is Chrome nickel iron, tin plated. Weight 24.25 oz., length 3 19/32 in. Clearance at top .023 in.; at skirt .002 in. 3 rings used. Compression rings .0930-.0935 wide, gap .009 to .014 in. Oil rings .1860-.1865 in. wide, gap .007 to .017 in. Depth of compression ring grooves .158 in. Depth of oil ring groove .188 in. Rod and piston assemblies are removed from above.

Carburetor

Carter model 432S with Climatic Control. Adjustments: Idle adjusting screw controls gas, turn out for richer idle mixture, standard setting is ½ to 1¼ turns open. Accelerator pump arm has 3 holes, enter rod in hole on longest radius to secure greatest accelerating charge. To check accelerating pump stroke, set pump in center hole, back off idle speed adjusting set screw till throttle is completely closed. From completely closed to wide open position of the throttle pump plunger should move 17/64 in.

Float height: Distance from top of projection on float cover to top of soldered seam on float should be ½ in. Set metering rod height with gage No. T-109-102. Automatic choke adjustment is clearly marked on the Climatic Control housing.

Connecting Rods

Lower bearings are steel backed white bearing metal alloy removable inserts. Clearance .0005 to .0015 in. End play .005 to .010 in. Wrist pin 2⅞ in. x 15/16 in. locked in rod. Rod and piston assemblies are removed from above.

Main Bearings

Steel backed white bearing metal alloy inserts which may be removed from below without disturbing chain or clutch. Clearance .001 to .003 in. End play .003 to .008 in. Thrust is taken at the rear center main.

Generator

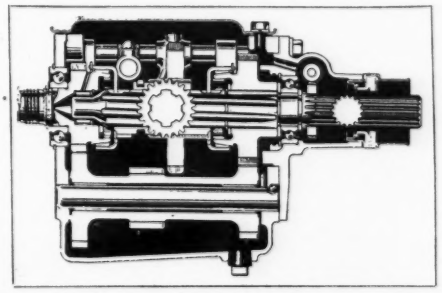
Delco Remy model 1,100,003, fixed third brush type with voltage regulator. Maximum charging rate: hot 25 to 28 amp., 8 volts at 3600 r.p.m.; cold 26 to 30 amp., 8 volts at 3400 r.p.m. Cutout relay closes at 7.0 to 7.5 volts; opens 0 to 3 amp. Voltage regulator is set to 7.6-7.9 volts.

Starter

Delco Remy model, 107,914. Lock test 600 amp., 3 volts, 15 ft.-lb. torque. No load test 65 amp., 5.0 volts, 5500 r.p.m. Gear ratio between starter pinion and flywheel gear—15.56/1.

Steering Gear

Saginaw worm and roller type with eccentric sleeve. To remove cross shaft end play, turn steering wheel to the end position (not quite against the stops), loosen jamb nut "A" shown in illustration. Tighten adjusting screw "B" securely and then back off until bearing can just be felt. Tighten jamb nut. To remove worm end play proceed in the same manner as outlined for cross shaft end play substituting nut "C" and adjusting screw "D" for "A" and "B". To remove backlash between worm and roller, center steering wheel, loosen lash adjuster locknut "E" and tap lash adjuster "F" in direction of arrow until a pull of 1½ to 2 lb. exerted at rim of steering wheel is required to turn wheel.

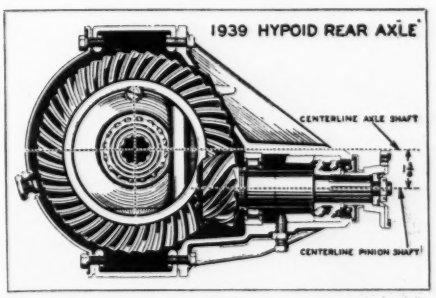


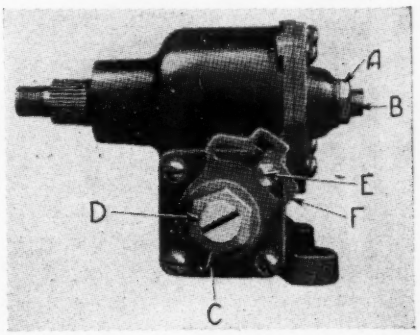
Transmission

DISASSEMBLY: Remove transmission from car. Remove cover. Remove shifter shafts, selector shafts and forks. (Make sure poppet springs and balls, which are below shifter shafts, do not fall into transmission.) Remove rear bearing retainer cap screws and withdraw retainer and mainshaft as a unit. Now take out low and reverse sliding gear and sleeve. Drive countershaft through rear of case permitting gear cluster to fall to bottom of case. Remove snap ring from front bearing and tap main drive shaft out through case. Lift out countershaft gear cluster. Remove spring anchor set screw at lower left side of case which will permit the removal of the idler shaft. Main drive gear and synchronizer gears are held with lock wires. Reassemble in reverse order.

Spark Plugs

A-C 45. Set gap to .025 in.





STUDEBAKER

COMMANDER 9A

Engine

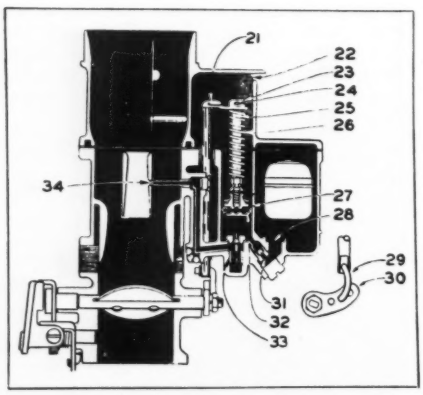
Starting serial No. 4110001 (South Bend) and 4802301 **(Pacific Coast).** Six cylinders, 3 5/16 in. bore x 4⅜ in. stroke. Piston displacement, 226 cu. in. Maximum brake horsepower, 90 at 3400 r.p.m. Compression ratio: standard 6.0 to 1, optional 7.0 to 1. Firing order, 1-5-3-6-2-4. Cylinder head bolts should be tightened to 84 ft. lb.

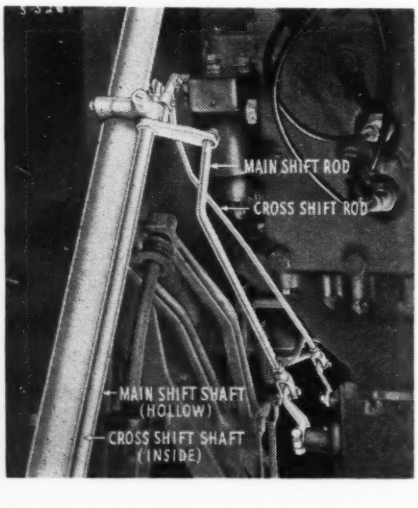
Carburetor

Stromberg EXO-26, 1¼ in. Idle adjusting screw controls gas. Turn out for richer mixture. There are three adjustments provided for the accelerating pump. Place pump link in hole on shortest radius of lever for shortest stroke of accelerating pump. Fuel level should be ⅝ in. below the surface of float bowl. Main metering jet size .059 in. First smaller size jet .058 in. Second smaller size jet .056 in. These jets are used with both the mesh type and oil bath type air cleaners.

Distributor

Auto Lite Model IGW-4101, full automatic advance type. Breaker point gap .020 in. Centrifugal advance 21 deg. on flywheel. Vacuum advance 12 deg. on flywheel.





Ignition Timing

Spark occurs 9/64 in. before U.D.C. or when mark on vibration damper alines with pointer.

Spark Plugs

Standard equipment is Champion 8, 18 mm. Set gap to .025 in.

Valves

Seat angle of inlet and exhaust valves, 45 deg. Operating tappet clearance, .016 in. cold.

Valve Timing

With tappets set to .020 in., inlet valve opens 15 deg. before top center, exhaust valve closes 10 deg. after top center. Punch mark on cam shaft gear should come between punch marks on crankshaft gear.

Steering

Ross cam and twin lever. Up and down play in worm is adjusted by removing shims, end play in the cross shaft is adjusted by adjusting screw.

Front End Suspension

Caster angle—minus ¼ deg. to plus ¾ deg.; camber ¼ deg. to ¾ deg.; toe in 1/16 in. to ⅛ in.; king pin inclination 5½ deg. Adjust camber by turning eccentric at outer end of steering knuckle support arm. Toe in is adjusted by turning the threaded tie rod after loosening the two clamp bolts. The caster angle is not adjustable.

Voltage Control Unit

Current and voltage regulator. Maximum charging rate 28 amp. Voltage at cut out closing, 6.4. Voltage at normal charging 8.0.

Connecting Rods

Connecting rod bearings are spun in type. Correct clearance at crankshaft is .0005 in. to .002 in. Rod and piston assemblies may be removed from above. Rod bolts should be tightened to 43-50 ft. lb.

Main Bearings

Steel backed babitt, slip in type. Clearance .0005 in. to .0025 in. Main bearing cap screws should be tightened to 1100 in. lb.

Battery

Willard SW-1-95. Ampere hours, 95. Positive terminal grounded.

Starting Motor

Auto Lite Model MAW-4015. Normal engine cranking speed, 130 r.p.m. Normal starter cranking speed, 1590 r.p.m. Normal starter current, 60 amperes. Lock torque, 12 ft. lb. Starter current with armature locked, 600 amperes. Starter is equipped with Bendix drive.

Starter Switch

Starter is controlled by button on dash which operates relay type starter switch.

Rear Axle

Spicer hypoid type. Pinion bearings are adjusted by shims back of front bearing cone. Mesh of pinion is adjusted by shims back of rear bearing cup. Differential bearings are adjusted by means of shims.

Generator

Auto Lite Model CDA-4804A, two brush type with output controlled by current-voltage regulator.

Brakes

Lockheed hydraulic, 11-in. drum diameter. Lining dimensions per wheel: 19 11/16 in. x 2 in. x 3/16 in. Per cent of braking power on front wheels, 55. Total braking area, 150 sq. in. Parking brake operates rear service shoes. Minor adjustment: Jack up the wheels so that they clear the ground. Turn the shoe adjustment bolt with a wrench until the shoe contacts the drum, then back off until just free of drag when wheel is rotated in either direction. In order to reduce the clearance between shoe and drum, the adjustment bolt must be turned toward the nearest point of the wheel rim when the wrench is pointing upwards. Major adjustment: If the eccentric anchor pin has been incorrectly adjusted, or when relining the brakes, it is necessary to relocate the shoe within the drum by adjusting the anchor pin. To do this, turn the eccentric anchor pin and rotate the shoe adjustment cam until the shoes are set to .005 in. clearance at the lower end and .010 in. at the upper end. These measurements should be made with a feeler gauge, at a point 1½ in. from the ends of the lining.

Lubrication

Oil pan capacity, 6 qt. Average oil pressure, high speed 40 lb. Transmission oil capacity: 2½ lb. or pt. Transmission with overdrive, oil capacity: 4 lb. or pt. Rear axle lubricant capacity: 3 lb. or pt.

STUDEBAKER

PRESIDENT 5C

Engine

Starting serial No. 7125501 (South Bend) and 7802501 (Pacific Coast). Eight cylinders, 3 1/16 in. bore x 4¼ in. stroke. Piston displacement, 250.4 cu. in. Maximum brake horsepower, 110 at 3600 r.p.m. Compression ratio: Standard, 6.0 to 1, optional 6.5 to 1. Firing order 1-6-2-5-8-3-7-4. Cylinder head bolts should be tightened to 84 ft. lbs.

Carburetor

Stromberg AAO-161, 1 in. dual. Idle adjusting screw controls gas, turn out for richer adjustment. Two holes are provided in the throttle lever for the accelerating pump rod. Place pump rod in hole on shorter radius for summer adjustment of pump. Fuel level should be ⅝ in. below top surface of float bowl. Main metering jet size .047 in. First smaller jet .045 in. Second smaller jet .043 in. These jets are used with both types of air cleaners.

Distributor

Delco-Remy model 662M, full automatic advance type. Breaker point gap .020 in. Centrifugal advance.

Ignition Timing

Spark occurs when the mark U. D. C. 1-8 on vibration damper is in line with pointer.

Spark Plugs

Standard equipment is Champion 8, 18mm. Set gap to .025 in.

Valves

Seat angle of inlet and exhaust valves, 45 deg. Operating tappet clearance, .016 in., cold.

Valve Timing

With tappets set to .020 in., inlet valve opens 15 deg. before top center, exhaust valve closes 10 deg. after top center. Punch mark on cam shaft gear should come between punch marks on crankshaft gear.

Steering Gear

Ross cam and twin lever. Up and down play in worm is adjusted by removing shims, end play in the cross shaft is adjusted by adjusting screw.

Front End Suspension

Caster angle—minus ¼ deg. to plus ¾ deg., camber ¼ deg. to ¾ deg. Toe-in 1/16 in. to ⅛ in. King pin inclination 5½ deg. Adjust camber by adding or removing shims between steering knuckle support arm bracket and outer face of frame flange. Adding shims increases camber. Toe-in is adjusted by turning the threaded tie rod after loosening the two clamp bolts. The caster angle is not adjustable.

Voltage Control Unit

Current and voltage regulator. Maximum charging rate 28 amperes. Voltage at cut out closing, 6.4. Voltage at normal charging, 8.0.

Connecting Rods

Connecting rod bearings are steel backed, lead bronze, slip in. Rod and piston assemblies may be removed from above. Rod bolts should be tightened to 43-50 ft. lbs.

Main Bearings

Steel backed babbitt, slip in type. Clearance .001 in. to .003 in. Main bearing cap screws should be tightened to 1100 in. lbs.

Battery

Willard SW-1-95. Ampere hours 95. Positive terminal grounded.

Generator

Delco-Remy two brush type with output controlled current regulator and voltage regulator.

Starting Motor

Delco-Remy. Normal engine cranking speed, 110 r.p.m. Normal starter cranking speed 1625 r.p.m. Normal starter current, 60 amperes. Lock torque, 15 ft. lbs. Starter current with armature locked, 600 amperes. Starter is equipped with overrunning clutch type pinion.

Starter Switch

Starter is controlled by button on dash which operates solenoid on starting motor.

Rear Axle

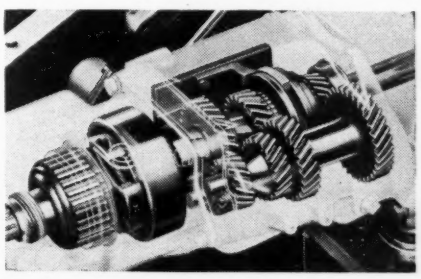
Spicer hypoid type. Pinion bearings are adjusted by shims back of front bearing cone. Mesh of pinion is adjusted by shims back of rear bearing cup. Differential bearings are adjusted by means of shims.

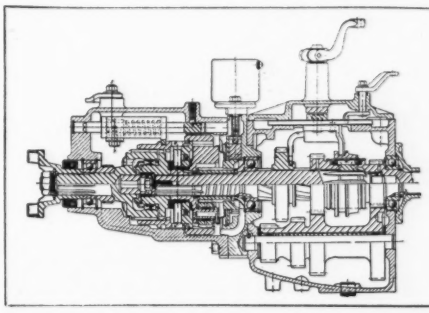
Brakes

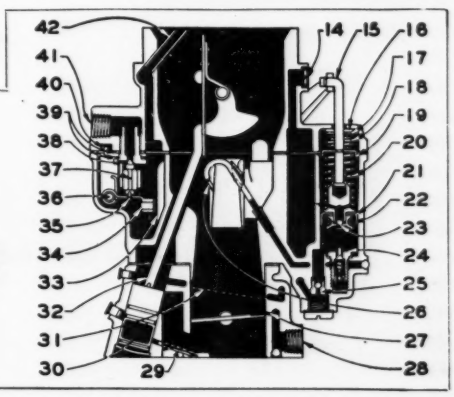
Lockheed Hydraulic with 11 in. drums. Lining per wheel 19 11/16 in. x 2¼ in. x 3/16 in. Per cent of braking power on rear wheels—45. Hand lever operates on rear service brake shoes. To adjust for normal lining wear, as indicated by the foot pedal going almost to floor board, jack up wheels and rotate each shoe adjustment cam until lining contacts drum. Back off each adjustment slightly until wheels rotate freely in either direction. To bring the shoe closer to drum, the adjustment cam must be turned toward the nearest point of the wheel rim when wrench is pointed upward. Major brake adjustment is made as follows—loosen anchor pin lock nuts on backing plate and turn anchors until correct adjustment is obtained. The recommended shoe setting is .005 in. at heel or lower end of shoe and .010 in. at the toe or upper end.

Clutch

Disc spring type, single plate. Clutch is removable (from flywheel) by removing the cap screws which hold the clutch cover to flywheel. The pressure plate may be removed from the cover by removing the three screws and pressure plate tension springs from the outer edge of the pressure plate, through the slots provided for this purpose in the clutch cover. After the three spring clips have been removed, hold the clutch cover inverted with hands over pressure plate to prevent the plate from falling. The pressure plate, spring and cover assembly are balanced in production and when the original units are re-assembled for installation, care must be exercised to make certain that the mark "O" on one of the driving lugs of the pressure plate aligns with the mark "O" on the flange of the clutch cover.







WILLYS

MODEL 48

Engine

Four-cylinder L head. 3⅛ in. bore x 4⅜ in. stroke, piston displacement 134.2 cu. in. Taxable horsepower 15.63. Maximum brake horsepower 48 at 3200 r.p.m. Maximum torque 100 ft. lbs. at 1600 r.p.m. Compression ratio 5.7 to 1. Compression pressure 87 lbs. at 216 r.p.m. Torque to tighten cylinder head bolts 70 to 74 ft. lbs. on cast iron heads, 39 to 42 ft. lbs. on aluminum heads. Firing order 1-3-4-2.

Distributor

Auto-Lite model IGS-4007 with vacuum control. Maximum automatic advance 14 degrees. Vacuum advance 10 degrees. Breaker point gap .020 in. Cam angle 47 degrees. Amperage draw of ignition coil 4 amps. with engine stopped and points closed, 2.5 amperes with engine idling.

Valve Timing

With tappets set to .010 in. inlet valve opens at top center or when the top center mark on flywheel aligns with pointer. Exhaust closes 5 degrees after top center or when the timing (ignition) mark on flywheel aligns with pointer. Marks on cam and crankshaft sprockets should be nearest each other and in line between shaft centers.

Spark Plugs

Champion C-7. Set gap to .025 in.

Ignition Timing

With breaker points set to .020 in. and vacuum unit in the normal position spark occurs 5 degrees after top center (.0103 in. piston travel after top center) or when the timing mark on flywheel aligns with pointer.

Valves

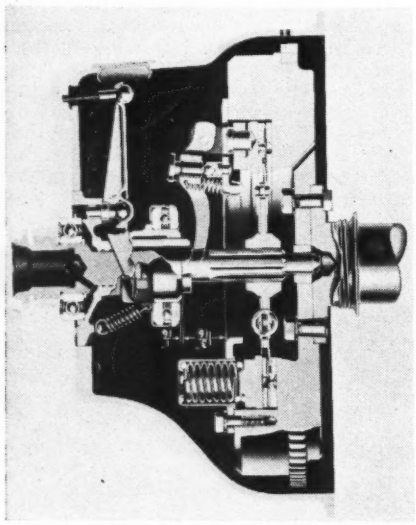
Operating tappet clearance inlet .004 in. exhaust .006 in. Tappet clearance for valve timing inlet and exhaust .010 in. Seat angle of valves 45 degrees. Overall length of valve 5¾ in.

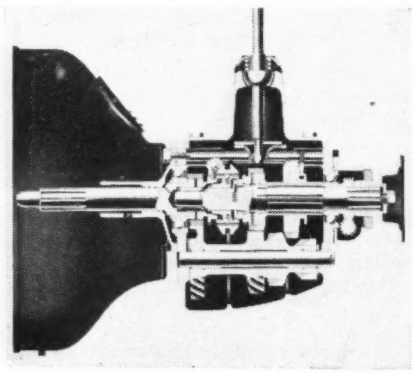
Valve Springs

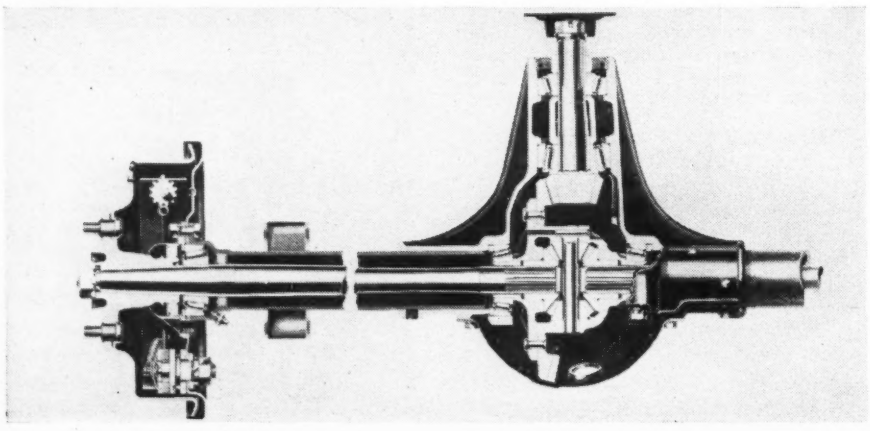
Spring pressure 46½ lbs. at 2¼ in.; 85½ lbs. at 1 15/16 in. Free length 2 11/16 in.

Pistons

Pistons are semi-steel. Weight 21 oz. Length 3¾ in. Clearance at skirt .002 to .0025 in. Ring groove depth—Oil .1665 in. Compression .1485 in. Number and width of rings—Oil rings 1-3/16 in. Compression rings 3-3/32 in. Piston and rod assemblies may be removed from above.







Connecting Rods

Rod bearings are spun in babbitt. No shims are used. Clearance .001 to .0025 in. End play .004 to .009 in. Wrist pin floats in piston and rod. Rod and piston assemblies may be removed from above.

Main Bearings

Mains are steel backed babbitt inserts. Clearance .001 to .0025 in. Crankshaft end play .004 to .006 in. Front main bearing takes crankshaft thrust. To renew main bearings it is necessary to remove the engine.

Carburetor

Tillotson model U-1A single downdraft type. To adjust: Before starting motor, open main or high speed adjustment at least two full turns, by turning to the left or out. Close idle adjustment to its seat by turning to the right or in and then open one turn. Start engine and run until thoroughly warm. Set throttle to run engine an equivalent of 25 to 30 miles per hour, and with engine running at this speed, turn main adjustment to the right or in until engine slows down for lack of fuel, then turn in the opposite direction, or out, until engine reaches its maximum speed for the above throttle setting. Now lean the mixture by turning needle to the right ⅜ turn which will be about the correct setting. Close throttle and set idle speed regulating screw to run engine slightly faster than normal idle speed. Slowly turn idle adjusting screw to the left until engine misses, then turn in the opposite direction until it fires evenly. Run engine at a faster speed for a few moments to clear manifolds, etc., and recheck idle adjustment. Set idle speed to operate car at 7 miles per hour when pulling in high gear.

Generator

Auto-Lite model GBM-4504 third brush type. Maximum charging rate hot 12.5 amps. at 8.0 volts, 2350 r.p.m. Max. charging rate cold 18 amps., 8.0 volts, 2400 r.p.m. Cut out relay closes at 7 to 7.5 volts, opens at zero to 2.5 amperes reverse current.

Starter

Auto-Lite model MZ-4049 with Bendix drive. Lock test 400 amps., 4 volts, 11.8 ft. lbs. torque. No load test 70 amps., 5.5 volts, 4300 r.p.m. Starter pinion meshes from front.

Tune Up Specifications—(1932 to 1939 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Intake Valve Opens Before or After T. C. — No. of Degrees (E = Exhaust Valve)	VALVES: Intake Valve Opens Before or After T. C. — No. of Flywheel Teeth (E = Exhaust Valve)	VALVES: Operating Tappet Clearance — Intake	VALVES: Operating Tappet Clearance — Exhaust	Rods Removed from	IGNITION: Spark Plug — Make and Model	IGNITION: Spark Plug — Gap	IGNITION: Timing — Spark Occurs — No. Deg. or Piston Travel	IGNITION: Timing — No. of Flywheel Teeth or Timing Marks	IGNITION: Timing — Breaker Gap	IGNITION: Timing — Breaker Housing	Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lb.) (Standard Head)	CRANK-PIN: Diameter	CRANK-PIN: Length	FRONT AXLE: Caster (Degrees)	FRONT AXLE: Camber (Degrees)	FRONT AXLE: Toe-In (Inches)	FRONT AXLE: Kingpin Inclination (Degrees)
Auburn 8-100 1932-33	8-3x4¾	.010	5B	1½B	.007H	.007H	B	Ch-C4	.027	13B	3¾B	.021	A	8	21	83	2⅛	1¼	1-2E	2	1/16–⅛	7
Auburn 8-100A 1932	8-3x4¾	.012	5B	1¼B	.007H	.007H	B	Ch-2	.026	12½B	3¾B	.021	A	8	19	84	2⅛	1¼	1-2E	2	1/16–3/16	7
Auburn 12 Cyls. (All) 1932-34	12-3½x4½	.015	TC	TC	.010H	.010H	B	Ch-C7	.025	11B	3½B	.021	A	9	37	89			1½-2E	2	1/8	7
Auburn 8-101 1933	8-3x4¾	.012	5B	1½B	.007H	.007H	B	Ch-C4	.027	13B	3¾B	.021	A	8	21	83	2⅛	1¼	1-2E	2	1/8–3/16	7
Auburn 8-101A 1933	8-3x4¾	.010	5B	1¼B	.007H	.007H	B	Ch-2	.026	12½B	3¾B	.021	A	8	19	84	2⅛	1¼	1-2E	2	1/8–1/16	7
Auburn 8-105 1933	8-3x4¾	.010	5B	1½B	.007H	.007H	B	Ch-2	.026	12½B	4B	.021	A	8	19	82	2⅛	1¼	1-2E	2	1/16–1/16	7
Auburn 652X 1934	6-3 1/16x4¾	.010	5B	1½B	.007H	.007H	B	Ch-J6	.025	3B	1B	.019	Au	6	17½	103	2½	1¼	1-2E	1½	1/8–1/16	7½
Auburn 652Y 1934	6-3 1/16x4¾	.010	5B	1½B	.007H	.007H	B	Ch-J6	.025	3B	1B	.019	Au	6	17½	103	2½	1¼	1-2E	1½	1/8–1/16	7½
Auburn 850X 1934	8-3 1/16x4¾	.010	B5	1½B	.007H	.007H	B	Ch-7	.025	3B	1B	.015	Au	8	20	83	2½	1¼	1-2E	1½	1/8–1/16	7½
Auburn 850Y 1934	8-3 1/16x4¾	.010	5B	1½B	.007H	.007H	B	Ch-J6	.025	3B	1B	.015	Au	8	21	103	2½	1¼	1-2E	1½	1/8–1/16	7½
Auburn 653 1935	6-3 1/16x4¾	.010	5B	1½B	.007H	.007H	B	Ch-J6	.025	3B	1B	.019	Au	6	17½	103	2⅝	1¼	3½-4	1½	1/8–1/16	7½
Auburn 851 1935	8-3 1/16x4¾	.010	5B	1½B	.007H	.007H	B	Ch-7	.025	3B	1B	.015	Au	8	20	103	2⅝	1¼	1-2E	1½	1/8–1/16	7½
Auburn 654 1936	6-3 1/16x4¾	.012	7½B	2¼B	.010H	.010H	B	Ch-J6	.025	3B	1B	.018	Au	6	16	103	2½	1¼	3½-4	1½	1/8	7½
Auburn 852, SC-852 1936	8-3 1/16x4¾	.012	7½B	2¼B	.010H	.010H	B	Ch-J6	.025	3B	1B	.018	Au	8	20	110	2⅛	1¼	2-3	1½	1/8	7½
Austin A75, 275 1932	4-2.2x3	....	TC	TC	.003H	.003H	C	Ch-C7	.027	.020B	.....	.020	....	2½	6	76	1 1/16	1¼	5	2¾	1/16–⅛	.....
Austin§ 1932	4-2.2x3	.003	TC	TC	.003H	.004H	B	Ch-C7	.027	.020B	.....	.020	....	2½	6	76	1 1/16	1¼	5	.....	1/16	1½
Austin 375, 475 1933-35	4-2.2x3	.005	TC	TC	.005H	.007H	B	Ch-C7	.027	.020B	.....	.018	Re	2½	6	76	1 1/16	1¼	5	1¼	1/16 ± 1/32	1½
Bantam 60 1938	4-2.2x3	.006	19B	4¼B	.006	.006	A	A-A9	.025	2B	½B	.022	Au	3	7	90	1 1/16	1¼	11	½	1/16–⅛	0
Bantam 60 1939	4-2.2x3	.011	19B	4¼B	.011H	.012H	A	A-A9	.025	TC	TC	.022	Au	3	4	125	1 1/16	1¼	11	1¼	1/16–⅛	1½
Buick 50 1932	8-2 1/16x4 1/16	.008	13½B	5½B	.008H	.008H	B	AC-J12	.022	7B	3B	.020	A	7	12	60	2¼	1 1/16	1¼-2	1-2	1/8–3/16	9½
Buick 60 1932-33	8-3 1/16x4 5/8	.008	13½B	5¾B	.008H	.008H	B	AC-J12	.027	11B	4¾B	.020	A	8	.....	.....	2 3/16	1 1/16	1½-2	1-2	.....	8
Buick 80 1932	8-3 1/16x5	.008	13½B	5¾B	.008H	.008H	B	AC-J12	.027	10B	4¼B	.020	A	9	19	64	2⅝	1 1/16	1½-2	1-2	1/8–3/16	8
Buick 90 1932	8-3 1/16x5	.008	13½B	5¾B	.008H	.008H	B	AC-J12	.027	10B	4¼B	.020	A	9	19	64	2⅝	1 1/16	1½-2	1-2	1/8–3/16	8
Buick 50 1933	8-2 1/16x4¼	.008	13½B	5½B	.008H	.008H	B	AC-J12	.027	7B	3B	.020	A	7	16	74	2⅛	1 1/16	1½-2	1-2	3/32–3/32	9½
Buick 80, 90 1933	8-3 1/16x5	.008	13½B	5¾B	.008H	.008H	B	AC-J12	.027	10B	4¼B	.020	A	9	19	64	2⅝	1 1/16	1½-2	1-2	3/32–3/32	8
Buick 40 1934-35	8-3 3/32x3 7/16	.012	4½B	3B	.008H	.008H	B	AC-H9	.025	2B	1B	.015	A	7	14	88	2	1¼	2¾-3¼E	0-¾	0–⅛	4½(b)
Buick 50 1934-35	8-2 13/16x4¼	.008	13½B	5½B	.008H	.008H	B	AC-H9	.022	7B	2¾B	.015	A	7	15	82	2⅛	1 1/16	1¾-2¼E	0-¾	0–⅛	5½(b)
Buick 60 1934-35	8-3 1/16x4 5/8	.008	13½B	5¾B	.008H	.008H	B	AC-H9	.022	11B	4¾B	.015	A	8	18	82	2 3/16	1 1/16	1-1¼E	0-¾	0–⅛	5½(b)
Buick 90 1934-35	8-3 1/16x5	.008	13½B	5¾B	.008H	.008H	B	AC-H9	.022	10B	4¾B	.015	A	9	23	74	2⅝	1 1/16	1-1¼E	0-¾	0–⅛	5½(b)
Buick 40 1936	8-3 3/32x3 7/16	††	8B	3¼B	.015H	.015H	A	AC-H9	.025	2B	¾B	.015	½A	6	13¼	118†	2	1¼	3-3½	¼N–¾P	1/16–⅛	3½-4½
Buick 60, 80 1936	8-3 1/16x4 1/16	††	14B	6B	.015H	.015H	A	AC-H9	.025	10B	4½B	.015	½A	8	17	108†	2¼	1 1/16	1¾-2¼	½N–¾P	1/16–⅛	4¼-5¼
Buick 90 1936	8-3 1/16x4 1/16	††	14B	6B	.015H	.015H	A	AC-H9	.025	10B	4½B	.015	½A	8	17	108†	2¼	1 1/16	¾-1¼	0-1¼P	1/16–⅛	4-5
Buick 40 1937	8-3 3/32x4½	††	13B	5¼B	.015H	.015H	A	AC-H9	.024	2B	¾B	.015	Au	6	13¼	120†	2	1 1/32	¼N–⅝P	¼N–1P	0–1/16	3½-4½
Buick 60, 80, 90 1937	8-3 1/16x4 5/16	††	14B	6B	.015H	.015H	A	AC-H9	.024	10B	4¼B	.015	Au	8	17	119†	2¼	1 1/16	¼N–⅝P	¼N–1P	0–1/16	.....
Buick 40 1938-39	8-3 3/32x4½	††	13B	5¼B	.015H	.015H	A	AC-46	.025	4B	1½B	.015	Au	6	13¼	112	2	1.21	⅛N–±⅜	¼N–1P	0–1/16	3½-4½
Buick 60, 80, 90 1938-39	8-3 1/16x4 5/16	††	14B	6B	.015H	.015H	A	AC-46	.025	6B	2½B	.015	Au	8	17	114	2¼	1.31	⅛N–±⅜	¼N–1P	0–1/16	F
Cadillac V8-355B 1932	8-3 5/16x4 1/16	.006	6B	1¾B	.006C	.008C	B	AC-G10	.028	9B	2¾B	.020	Au	8	26	88	2⅜	2¾	2½-3½	1½	1/8–¼	7¾
Cadillac V12-370B 1932	12-3½x4	.000	TC	TC	AA	AA	B	AC-G7	.026	15B	4¾B	.021	Au	9	24	79	2½	2¼	2¼-3¼E	1½	1/16	7¾
Cadillac V16-452B 1932	16-3x4	.000	TC	TC	AA	AA	B	AC-G7	.026	10 1/4B	3¼B	.016	Au	10	28	81	2½	2¼	2½-3¼E	1½	1/16	7¾
Cadillac V8-355C 1933	8-3 5/16x4 1/16	.006	6B	1¾B	.006C	.008C	B	AC-G7	.026	9B	2¾B	.021	Au	8	26	88	2⅜	2¼	2½-3½	1½	1/8–¼	7¾
Cadillac V12-370C 1933	12-3½x4	.000	TC	TC	AA	AA	B	AC-G7	.026	4B	1¼B	.021	Au	9	24	91	2½	2¼	2½-3¼E	1½	1/16	7¾
Cadillac V16-452C 1933	16-3x4	.000	TC	TC	AA	AA	B	AC-G7	.026	4B	1¼B	.016	Au	10	28	93	2½	2¼	2½-3¼E	1½	1/16	7¾
Cadillac V8-355D 1934-35	8-3 5/16x4 1/16	.006	6B	1¾B	.006C	.010C	B	AC-G7	.026	4B	1B	.015	Au	8	20	99	2⅜	2¾	1-2E	¾-1½	1/8–1/16	5
Cadillac V12-370D 1934-35	12-3½x4	.000	TC	TC	AA	AA	B	AC-G6	.026	4B	1B	.021	Au	9	19	99	2½	2¼	1-2E	¾-1½	1/8–1/16	5
Cadillac V16-452D 1934-35	16-3x4	.000	TC	TC	AA	AA	B	AC-G6	.026	4B	1B	.016	Au	10	23	94	2½	2¼	1-2E	¾-1½	1/16–1/16	5
Cadillac V8-60 1936	8-3 5/16x4½	.000	TC	TC	AA	AA	A	AC-K9	.026	5B	2B	.015	Au	7	30	103	2.46	2 1/32	1½-2	¼-1	0–1/16	4°-51′
Cadillac V8-70, 75 1936	8-3 1/16x4½	.000	TC	TC	AA	AA	A	AC-K9	.026	5B	2B	.015	Au	7	29	103	2.46	2 1/32	¾-1¼	0-½	0–1/16	5°-38′
Cadillac V12-80, 85 1936	12-3½x4	.000	TC	TC	AA	AA	B	AC-G6	.026	4B	1¼B	.021	Au	9	19	99	2½	2¼	¾-1¼	0-½	0–1/16	5°-38′
Cadillac V16-90 1936	16-3x4	.000	TC	TC	AA	AA	B	AC-G6	.026	4B	1¼B	.016	Au	10	24	99	2½	2¼	1½	1	1/8–1/16	4
Cadillac V8-60 1937	8-3 1/16x4½	.000	TC	TC	AA	AA	A	AC-K7	.027	5B	2¼B	.015	Au	7	25	155†	2 3/32	1 1/32	¼-1	¼-1	3/32–3/32	4°-51′
Cadillac V8-65, 70, 75 1937	8-3 1/16x4½	.000	TC	TC	AA	AA	A	AC-K7	.027	5B	2¼B	.015	Au	7	25	170†	2 3/32	1 1/32	0–±¼	0-½	3/32–3/32	5°-33′
Cadillac V12-85 1937	12-3½x4	.000	TC	TC	AA	AA	B	AC-G7	.025	10B	3B	.021	Au	9	17	145†	2½	2¼	0–±¼	0-½	0–1/16	5°-33′
Cadillac V16-90 1937	16-3x4	.000	TC	TC	AA	AA	B	AC-G6	.025	4B	1¼B	.016	Au	10	24	154†	2½	2¼	0–±¼	0-½	0–1/16	4½
Cadillac V8-60, 60S 1938	8-3 1/16x4½	AA	TC	TC	AA	AA	A	AC-45	.027	5B	2¼B	.015	A	7	24	155†	2.46	2 1/32	¾N-0	¼-1	3/32–3/32	4°-51′
Cadillac V8-65 1938	8-3 1/16x4½	AA	TC	TC	AA	AA	A	AC-45	.027	5B	2¼B	.015	A	7	25	155†	2.46	2 1/32	⅛N–¼P	0-½	3/32–3/32	5°-38′
Cadillac V8-75 1938	8-3 1/16x4½	AA	TC	TC	AA	AA	A	AC-45	.027	5B	2¼B	.015	A	7	25	170†	2.46	2 1/32	⅛N–¼P	0-½	3/32–3/32	5°-38′
Cadillac V16-90 1938	16-3 1/4x3 1/4	AA	8B	3½B	AA	AA	A	AC-45	.027	6B	2½B	.015	A	11	30	180†	2.	1¾	⅛N–¼P	0-½	3/32–3/32	5°-38′
Cadillac V8-61, 60S 1939	8-3 1/16x4½	AA	TC	TC	AA	AA	A	AC-104	.027	5B	2¼B	.015	A	7	25	155†	2.46	2 1/32	G	GG	3/32–3/32	GH
Cadillac V8-75 1939	8-3 1/16x4½	AA	TC	TC	AA	AA	A	AC-104	.027	5B	2¼B	.015	A	7	25	170†	2.46	2 1/32	¼N–¼P	0-½	3/32–3/32	5°–1′
Cadillac V16-90 1939	16-3 1/4x3 1/4	AA	6B	2½B	AA	AA	A	AC-104	.032	6B	2½B	.015	A	11	30	180†	2.	1¾	¼N–¼P	0-½	3/32–3/32	5°–1′
Chevrolet BA-Confederate 1932	6-3 3/16x3 3/4	.010	4B	1B	.006H	.008H	A	AC-G10	.024	12B	3¾B	.018	A	5	10	80	2⅛	1 11/64	2¼E	1½	1/16–1/16	7⅛
Chevrolet CC-Standard 1933	6-3 1/16x3 1/2	.010	4B	1¼B	.006H	.008H	A	AC-K9	.032	10B	3B	.018	Au	4½	9	80	2⅛	1 9/32	½-1½E	1	1/16–3/32	7⅛
Chevrolet CA-Master 1933	6-3 1/16x4	.010	4B	1¼B	.006H	.008H	A	AC-K9	.032	10B	3B	.018	Au	5	10½	80	2⅛	1 9/32	½-1½E	1	1/16–3/32	7⅛
Chevrolet DC-Standard 1934	6-3 1/16x3 1/2	.010	4B	1B	.006H	.013H	A	AC-K9	.032	10B	3B	.018	Au	4½	10	80	2⅛	1 13/32	1¼-2¼E	½-1½	3/32–⅛	7⅛
Chevrolet DA-Master 1934	6-3 1/16x4	.010	4B	1½B	.006H	.013H	A	AC-K10	.032	10B	3¾B	.018	Au	5	10½	83	2⅛	1 9/32	0	1	1/16–3/32	7
Chevrolet EC, EA, ED 1935	6-3 1/16x4	.006	4B	1½B	.006H	.013H	A	AC-K11	.032	5B	2B	.018	Au	5	.....	86	2⅛	1 9/32	.....	.....	.....	.....
Chevrolet FD-Master Conv. 1936	6-3 1/16x4	.006	9B	3¼B	.006H	.013H	A	AC-K11	.032	5B	1¾B	.018	Au	5	15	112	2⅛	1½	3±½	1±½	3/64–⅛	7⅛-±1
Chevrolet FA, FC 1936	6-3 1/16x4	.006	9B	3¼B	.006H	.013H	A	AC-K11	.032	5B	1¾B	.018	Au	5	15	112	2⅛	1½	.....	.....	.....	.....
Chevrolet GA, GB 1937	6-3½x3 3/4	.006	9B	3¼B	.006H	.013H	A	AC-K11	.040	5B	1¾B	.020	Au	5	14	112	2⅛	1 1/16	.....	.....	.....	.....
Chevrolet HA, HB 1938	6-3½x3 3/4	.006	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2⅛	1 1/16	FA	FB	FC	FD
Chevrolet Master 85 1939	6-3½x3 3/4	.006	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2⅛	1 1/16	2¼ ± ½	1 ± ½	⅛–⅛	7⅛ ± 1
Chevrolet Master Deluxe 1939	6-3½x3 3/4	.006	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2⅛	1 1/16	0 ± ½	¼N ± ½	0–1/16	4¾
Chrysler CI 1932	6-3¼x4½	.011	6A	2A	.005H	.007H	A	AC-K12	.028	10B	3B	.020	Au	6	16	84	1 5/16	1 3/16	1–3	¼–¾	0–⅛	7
Chrysler CP 1932	8-3¼x4½	.011	6A	2A	.005H	.007H	A	AC-K12	.028	10B	3B	.020	A	6	19	80	2 1/16	1 1/8	1–3	¼–¾	0–1/16	7
Chrysler CH, CL-Imperial 1932	8-3½x5	.008	6A	2A	.005H	.007H	A	AC-K12	.028	11½B	4B	.020	A	8½	24	80	2 1/16	1 3/8	1–3	¼–¾	0–1/16	7
Chrysler CQ 1933	6-3¼x4½	.011	6A	2½A	.005H	.007H	A	AC-K12	.025	TC	TC	.020	Au	6	15½	85	1 13/16	1 3/8	1–3	¼–¾	0–1/16	7
Chrysler CT-Royal 1933	8-3¼x4½	.011	6A	2½A	.005H	.007H	A	AC-K12	.025	2B	¾B	.018	A	6	19½	80	2 1/16	1 1/8	1–3	¼–¾	0–1/16	7
Chrysler CQ-Imperial 1933	8-3¼x4½	.011	6A	2½A	.005H	.007H	A	AC-K12	.025	10B	4B	.018	Au	6	20	80	2 1/16	1 1/8	1–3	¼–¾	0–1/16	7
Chrysler CL-Imp. Cust. 1933-34	8-3½x5	.008	6A	2A	.005H	.007H	A	AC-K12	.026	11½B	4B	.019	A	8½	28	80	2 1/16	1 3/8	1–3	¼–¾	0–1/16	7
Chrysler CA, CB 1934	8-3 3/8x4½	.010	TC	VDM	.005H	.007H	A	AC-S9	.025	TC	VDM	.020	Au	6	15½	87	2⅛	1 1/8	½–2½	¼–¾	1/16–⅛	8¼–10¼
Chrysler CU-Airflow 1934	8-3¼x4½	.011	2B	VDM	.005H	.007H	A	AC-SL9	.025	6A	VDM	.018	Au	6	23	110	2 1/16	1 1/8	1–3	¼–¾	1/16–⅛	9
Chrysler CV-Imp. Airflow 1934	8-3¼x4 7/8	.011	2B	VDM	.005H	.007H	A	AC-SL9	.025	5A	VDM	.018	Au	6	23	110	2 1/16	1 1/8	1–3	¼–¾	1/16–⅛	9
Chrysler C6-Airstream 1935	8-3 3/8x4½	.012	2B	VDM	.006H	.008H	A	AC-KL-9	.025	TC	VDM	.018	Au	6	15½	99	2⅛	1 1/8	½–2½	¼N–½P	1/16–⅛	8¼–10⅓
Chrysler CZ-Airstream 8 1935	8-3¼x4½	.012	2B	VDM	.006H	.008H	A	AC-K-9	.025	TC	VDM	.018	Au	6	20	103	2 1/16	1 1/8	½–2½	¼N–½P	1/16–⅛	4¼–5¾
Chrysler C1-Airflow 1935	8-3¼x4 7/8	.012	2B	VDM	.006H	.008H	A	AC-KL9	.025	TC	VDM	.018	Au	6	19	103	2 1/16	1 1/8	2	¼–¾	1/16–⅛	4
Chrysler C2-Imp. Airflow 1935	8-3¼x4 7/8	.012	2B	VDM	.006H	.008H	A	AC-KL9	.025	TC	VDM	.018	Au	6	19	110	2 1/16	1 1/8	2	¼–¾	1/16–⅛	4
Chrysler C3-Imp. Cust. Airfl. 1935	8-3¼x4 7/8	.011	2B	VDM	.006H	.008H	A	AC-KL9	.025	5A	VDM	.018	Au	6	19	110	2 1/16	1 1/8	2	¼–¾	1/16–⅛	4
Chrysler C7-Airstream 1936	6-3 3/8x4½	.010	TC	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.020	Au	6	19	99	2⅛	1 1/8	1½	¼N–½P	0–1/8	9¾
Chrysler C8-DeL. Airstream 1936	8-3¼x4½	.011	2B	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.018	Au	6	22	103	2 1/16	1 1/8	1½	¼N–½P	0–⅛	5¼
Chrysler C9-Airflow 1936	8-3¼x4 7/8	.011	2B	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.018	Au	6	17	103	2 1/16	1 1/8	2	½±¼	0–⅛	5

Tune Up Specifications—(1932 to 1939 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Intake Valve Opens Before or After T. C. — No. of Degrees (E = Exhaust Valve)	VALVES: Intake Valve Opens Before or After T. C. — No. of Flywheel Teeth (E = Exhaust Valve)	VALVES: Operating Tappet Clearance — Intake	VALVES: Operating Tappet Clearance — Exhaust	Rods Removed from	IGNITION: Spark Plug — Make and Model	IGNITION: Spark Plug — Gap	IGNITION: Timing — Spark Occurs—No. Deg. or Piston Travel	IGNITION: Timing — No. of Flywheel Teeth or Timing Marks	IGNITION: Timing — Breaker Gap	IGNITION: Timing — Breaker Housing	Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lb.) (Standard Head)	CRANK-PIN — Diameter	CRANK-PIN — Length	FRONT AXLE — Caster (Degrees)	FRONT AXLE — Camber (Degrees)	FRONT AXLE — Toe-in (Inches)	FRONT AXLE — Kingpin Inclination (Degrees)
CHRYSLER—Cont.																						
Chrysler C10-Airflow Imp...1936	8-3¼x4⅞	.011	2B	VDM	.006H	.008H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2 3/16	1⅛	2	½±¼	0–⅛	5
Chrysler C11-Arf. Cust. Imp.1936	8-3¼x4⅞	.011	2B	VDM	.006H	.008H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2 3/16	1⅛	2	½±¼	0–⅛	5
Chrysler C18-Royal.....1937	6-3⅜x4¼	.014	TC	VDM	.008H	.010H	A	Ch-J8	.025	2A	VDM	.020	Au	5	20	110	2 1/16	1¼	1½	¼N–½P	0–⅛	4¾–6
Chrysler C14-Imperial.....1937	8-3¼x4⅛	.011	2B	VDM	.006H	.010H	A	Ch-H10	.025	3A	VDM	.018	Au	6	22	110	2 3/16	1⅛	1½	¼N–½P	0–⅛	4¾–6
Chrysler C15-Custom Imp...1937	8-3¼x4⅞	.011	2B	VDM	.006H	.010H	A	Ch-H10	.025	5A	VDM	.018	Au	6	21	110	2 3/16	1⅛	2	¼N–½P	0–⅛	4¾–6
Chrysler C17-Airflow.....1937	8-3¼x4⅞	.011	2B	VDM	.006H	.010H	A	Ch-H10	.025	5A	VDM	.018	Au	6	18	110	2 1/16	1⅛	2	¼–¾	0–⅛	4½–5½
Chrysler C18-Royal.....1938	6-3⅜x4½	.014	8B	VDM	.008H	.010H	A	Ch-J8	.025	TC	VDM	.020	Au	5	20	145†	2 1/8	1 3/32	½–2½	¼N–½P	0–⅛	4¾–6
Chrysler C19-Imperial.....1938	8-3¼x4½	.011	2B	VDM	.006H	.010H	A	Ch-J8	.025	3B	VDM	.018	Au	6	20	145†	2 1/8	1⅛	½–2½	¼N–½P	0–⅛	4¾–6
Chrysler C20-Cust. Imp.....1938	8-3¼x4⅞	.011	2B	VDM	.006H	.010H	A	Ch-H10	.025	TC	VDM	.018	Au	6	20	155†	2 1/8	1⅛	1–3	¼N–½P	0–⅛	4¾–6
Chrysler C22-Royal.....1939	6-3⅜x4½	.014	8B	VDM	.008H	.010H	A	A-A7	.025	TC	VDM	.020	Au	5	17	145†	2 1/16	1 3/32	½–2½	¼N–¾P	0–⅛	4¾–6
Chrysler C23.....1939	8-3¼x4⅛	.011	6B	VDM	.008H	.010H	A	A-A7	.025	TC	VDM	.018	Au	6	24	155†	2 3/16	1⅛	½N–1½P	¼N–½P	0–⅛	5¾–7
Chrysler C24-Cust. Imp.....1939	8-3¼x4⅛	.011	6B	VDM	.008H	.010H	A	A-AL6	.025	3B	VDM	.018	Au	6	24	155†	2 3/16	1⅛	1–3	¼N–½P	0–⅛	4¾–6
De Soto SC.....1932	6-3¼x4¼	.011	6A	2A	.005H	.007H	A	AC-K12	.028	9B	3B	.020	Au	6	14½	84	1 15/16	1⅜	1–3	¼–¾	0–1/16	7
De Soto SD.....1933	6-3¼x4⅜	.011	6A	2½A	.005H	.007H	A	AC-K12	.025	(k)	(k)	.020	Au	6	16	85	1 15/16	1⅜	1–3	¼–¾	0–1/16	7
De Soto SE.....1934	6-3⅜x4½	.010	TC	VDM	.005H	.007H	A	AC-K9	.025	3A	VDM	.020	Au	6	20	102	2 1/8	1⅛	1–3	¼–¾	1/16–⅛	9
De Soto SF, SG.....1935	6-3⅜x4½	.010	TC	VDM	.006H	.008H	A	AC-K9	.025	3A	VDM	.020	Au	6	17	.....	2 1/8	1⅛	.....	.....	.....	.....
De Soto S1, S2.....1936	6-3¼x4½	.010	TC	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.020	Au	6	19	.....	2 1/8	1⅛	.....	.....	.....	.....
De Soto S3.....1937	6-3¼x4¼	.014	TC	VDM	.008H	.010H	A	Ch-J8	.025	2A	VDM	.020	Au	5	20	110	2 1/8	1¼	1½	¼N–½P	0–¼	4¾–6
De Soto S5.....1938	6-3¼x4¼	.014	8B	VDM	.008H	.010H	A	A-A7	.025	TC	VDM	.020	Au	5	20	145†	2 1/8	1 3/32	½–2½	¼N–½P	0–⅛	4¾–6
De Soto S6.....1939	6-3⅜x4¼	.014	8B	VDM	.008H	.010H	A	A-A7	.025	2B	VDM	.020	Au	5	19	145†	2 1/8	1 3/32	½–2½	¼N–¾P	0–⅛	4¾–6
Dodge DL.....1932	6-3¼x4⅜	.011	6A	1¾A	.005H	.007H	A	AC-S9	.028	10B	3¼B	.020	Au	6	14½	86	2 3/16	1⅜	1–3	¼–¾	0–1/16	7
Dodge DK.....1932	8-3¼x4¼	.011	6A	1¾A	.005H	.007H	A	AC-S9	.028	10B	3¼B	.020	Au	6	18	80	1 15/16	1⅜	1–3	¼–¾	0–⅛	9
Dodge DP.....1933	6-3½x4⅜	.011	6A	2½A	.005H	.007H	A	AC-S9	.025	10B	4B	.018	Au	6	18½	88	2 1/16	1⅜	1–3	¼–¾	0–1/16	7
Dodge DO.....1933	8-3¼x4¼	.011	6A	2½A	.005H	.007H	A	AC-S9	.025	4A	1¾A	.020	Au	6	18½	91	2 1/16	1	1–3	¼N–½P	0–1/16	8¼–10¼
Dodge DR, DS.....1934	6-3¼x4⅜	.011	6A	VDM	.005H	.007H	A	AC-S9	.025	4A	VDM	.020	Au	5	17	110	2 1/16	1	1–3	¼–¾	0–⅛	8½
Dodge DU.....1935	6-3¼x4⅜	.011	6A	VDM	.006H	.008H	A	AC-K9	.025	4A	VDM	.020	Au	5	17	110	2 1/16	1	2	½±¼	0–1/16	9½
Dodge D2, D5, D8.....1936-38	6-3¼x4⅜	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	4A	VDM	.020	Au	5	15	140†	2 1/16	1	1–3	¼–¾	0–1/16	4½–5½
Dodge D11.....1939	6-3¼x4⅜	.011	6A	VDM	.006H	.008H	A	A-A7	.025	TC	VDM	.020	Au	5	15	140†	2 1/16	1	½N–1½P	¼N–½P	0–⅛	5¼–6¼
Essex Greater Super.....1932	6-2 11/16x4¾	.010	11B	3B	.004H	.006H	B	AC-G8	.022	TC	TC	.020	Au	6	18½	88½	1 1/16	1⅜	1–E	1	0–⅛	7
Ford B.....1932	4-3 7/16x4¼	.011	7½B	2B	.011C	.021C	A	Ch-C4	.030	TC	TC	.020	Au	5	12	68	.....	.....	8¾L	2	1/16	7
Ford 18-V8.....1932	8-3 1/16x3¾	.013	9½B	3B	.013C	.013C	A	Ch-C4	.025	4B	1¼B	.013	Au	5	22	88½	2	1¾	4½–9	¼–1	3/32	8
Ford 40-V8.....1933-34	8-3 1/16x3¾	.013	9½B	3B	.013C	.013C	A	Ch-C7	.025	4B	1¼B	.013	Au	5	22	105	2 1/16	1¾	4½–9	¼–1	3/32	8
Ford 48-V8.....1935	8-3 1/16x3¾	.013	9½B	3B	.013C	.013C	A	Ch-18	.025	4B	1¼B	.013	Au	5	20	105	2	1 1/16	4½–9	¼–1	3/32	8
Ford 68-V8.....1936	8-3 1/16x3¾	.013	9½B	3B	.013C	.013C	A	Ch-18	.025	4B	1¼B	.013	Au	5	22	105	2	1 1/16	4½–9	¼–1	1/16	8
Ford 74-V8 (60 Hp.).....1937	8-2.6x3.2	.013	9½B	3¼B	.013C	.013C	A	Ch-H10	.025	4B	1⅛B	.015	Au	4	15	105	1.60	1.54	4½–9	¼–1	1/16	8
Ford 78-V8 (85 Hp.).....1937	8-3 1/16x3¾	.013	TC	TC	.013C	.013C	A	Ch-18	.025	4B	1¼B	.015	Au	5	22	100	2	1 1/16	4½–9	¼–1	1/16	8
Ford 82A-V8 (60 Hp.).....1938	8-2.6x3.2	.013	9½B	3¼B	.013C	.013C	A	Ch-H10	.025	4B	1⅛B	.015	Au	4	15	105	1.60	1.54	4½–9	¼–1	1/16	8
Ford 81A-V8 (85 Hp.).....1938	8-3 1/16x3¾	.013	TC	TC	.013C	.013C	A	Ch-H10	.025	4B	1¼B	.015	Au	5	22	100	2	1 1/16	4½–9	¼–1	1/16	8
Ford 922A-V8 (60 Hp.).....1939	8-2.6x3.2	.013	9½B	3¼B	.013C	.013C	A	Ch-H10	.025	4B	1⅛B	.015	Au	4	15	158‡	1.60	1.54	4½–9	¼–1	1/16	8
Ford 91A-V8 (85 Hp.).....1939	8-3 1/16x3¾	.013	TC	TC	.013C	.013C	A	Ch-H10	.025	4B	1¼B	.015	Au	5	R	140	2	1¾	4½–9	¼–1	1/16	8
Franklin 16-16B-18A....1932-33	6-3½x4¾	.031	28A	9¾A	.007H	.007H	C	Ch-C7	.025	6B	2B	.020	A	6	Ac	84	2⅛	1 1/16	½–1E	2	0–⅛	7
Graham 822-834-Spec. Cus. 1932	8-3¼x4½	.010	TC	TC	.010H	.010H	B	Ch-C7	.025	5B	1½B	.020	A	8	26	80	2¼	1¼	1½–2½E	1½	1/8–3/16	7
Graham 53-Standard.....1932	6-3¼x4½	.010	TC	TC	.010H	.010H	B	Ch-C4	.025	1B	⅛B	.020	A	6	20	89	2¼	1¼	1½–2½E	1½	1/8–3/16	9
Graham 54-Special.....1932	6-3¼x4½	.010	TC	TC	.010H	.010H	B	Ch-C4	.025	1B	⅛B	.020	A	6	20	89	2¼	1¼	1½–2½E	1½	1/8–3/16	9
Graham 820-Special.....1932	8-3½x4	.012	TC	TC	.010H	.010H	B	Ch-C7	.025	EB	2B	.020	A	6	20	89	2⅛	1¼	1½–2½E	1	1/8–3/16	9
Graham 56-Pros., Gr. 6..1932-33	6-3⅛x4½	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	1B	⅛B	.020	Au	6	20	86½	2¼	1¼	1½–2½E	1	1/8–3/16	9
Graham 58.....1932	6-3¼x4½	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	3B	1B	.018	A	6	20	88	2¼	1¼	1½–2½	1½	1/8–3/16	7
Graham 57-Blue Streak....1932	8-3⅛x4	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	6B	2B	.020	A	6	20	109½	2⅛	1¼	1½–2½	1½	1/8–3/16	7
Graham 65-Standard.....1933	6-3¼x4½	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	3B	1¼B	.019	Au	6	20	109½	2¼	1¼	1½–2½	1½	1/8–3/16	7
Graham 64-Standard.....1933	6-3⅛x4	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	3B	1¼B	.019	Au	6	20	109½	2¼	1¼	1½–2½	1½	1/8–3/16	7
Graham 57A-Custom.....1933	8-3⅛x4	.012	TC	TC	.010H	.010H	B	Ch-C7	.025	3B	1B	.018	A	6	20	109½	2¼	1¼	1½–2½	1½	1/8–3/16	7
Graham 68-Standard.....1934	6-3¼x4½	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	3B	1B	.018	A	6	20	109	2¼	1¼	1½–2½	1–2	1/8	7–7½
Graham 67-Special.....1934	8-3⅛x4	.012	TC	TC	.010H	.010H	B	Ch-C4	.025	3B	1¼B	.018	Au	6	20	109½	2⅛	1¼	1½–2½	1–2	1/8	7–7½
Graham 69-Custom.....1934	8-3¼x4	.012	TC	TC	.010H	.010H	B	Ch-7	.025	3B	1¼B	.015	Au	6	20	113	2⅛	1¼	1½–2½	1–2	1/8	7–7½
Graham 74-Standard.....1935	6-3x4	.012	2B	1B	.010H	.010H	A	Ch-C7	.025	2B	¾B	.018	Au	5	15	95	1 11/16	1 1/16	1½–2½	1–2	1/8	7–7½
Graham 73-Special.....1935	6-3¼x4½	.012	TC	TC	.010H	.010H	B	Ch-C7	.025	3B	1¼B	.018	Au	6	17½	105	2¼	1¼	1½–2½	1–2	1/8	7–7½
Graham 72-Standard.....1935	8-3⅛x4	.012	TC	TC	.010H	.010H	B	Ch-C7	.025	3B	1¼B	.018	Au	7	18	115	2⅛	1¼	1½–2½	1–2	1/8	7–7½
Graham 75-Super Ch.....1935	8-3¼x4	.012	TC	TC	.010H	.010H	B	Ch-C7	.025	3B	1½B	.018	Au	7	18	115	2⅛	1¼	2	1	1/8	7
Graham 80, 80A-Crusader...1936	6-3x4	.012	4½B	1½B	.010H	.010H	A	Ch-C7	.025	2B	¾B	.018	Au	5	15	115	1 11/16	1 1/16	2½	1	1/8	7½
Graham 90-Cavalier.....1936	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-C7	.025	2B	¾B	.018	Au	5	15	114	1 11/16	1 1/16	2½	1	1/8	7½
Graham 90A-Cavalier.....1936	6-3¼x4	.012	2A	¾A	.012H	.012H	A	Ch-C7	.025	TC	TC	.018	Au	5	15	114	1 11/16	1 1/16	4–4½	1	1/8–3/16	7½
Graham 110-Sup. Ch.....1936	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025	TC	TC	.018	Au	5	15	114	1 11/16	1 1/16	2½	1	1/8	7½
Graham 85.....1937	6-3x4	.012	4½B	1½B	.010H	.010H	A	Ch-7	.025	2B	¾B	.018	Au	5	11	115	1 11/16	1 1/16	4½–5½	1	1/8–3/16	7½
Graham 95.....1937	6-3¼x4	.012	2A	¾A	.010H	.010H	A	Ch-J9	.025	TC	TC	.018	Au	5	15	114	2 1/16	1 1/16	4–4½	1	1/8–3/16	7½
Graham 116-Super Ch.....1937	6-3¼x4	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025	4A	1½A	.018	Au	5	15	114	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Graham 120-Super Ch.....1937	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025	4A	1½A	.018	Au	5	15	114	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Graham 98-Stand. & Spec..1938	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-J9	.025	4B	1½B	.018	Au	5	15	160†	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Graham 97-SC. & Cust. SC. 1938	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-J9	.025	4B	1½B	.018	Au	5	15½	120	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Graham 96-Spec. & Cust...1939	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025	TC	TC	.018	Au	5	14	120	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Graham 97-SC. & Cust. SC. 1939	6-3¼x4⅜	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025	4½A	1½A	.018	Au	5	15	130	2 1/16	1 1/16	3–4	1	1/8–3/16	7½
Hudson T, U, L 8.....1932	8-3x4½	.010	10 3/8B	3¼B	.004H	.006H	B	AC-G8	.022	TC	TC	.020	Au	9½	17	95	1 13/16	1⅜	1E	1	0–1/16	7
Hudson E-Super 6.....1933	6-2 11/16x4¾	.006	11B	3¼B	.006H	.008H	B	AC-K9	.022	TC	TC	.020	Au	6½	14½	103	1 13/16	1⅜	4E	1	0–1/16	7
Hudson T-Std. & L-Maj 8..1933	8-3x4½	.006	11B	3¼B	.006H	.008H	B	AC-G8	.022	TC	TC	.020	Au	8	17	95	1 13/16	1⅜	4E	1	0–1/16	7
Hudson LT, LTS.....1934	8-3x4½	.010	10 3/8B	4B	.006H	.008H	BA	Ch-J7	.022	TC	TC	.020	Au	7	23	93	1 15/16	1⅜	2½–3½E	2	0–1/16	7
Hudson LL.....1934	8-3x4½	.010	10 3/8B	4B	.006H	.008H	A	Ch-J7	.022	TC	TC	.020	Au	7	23	93	1 15/16	1⅜	2½–3½E	2	0–1/16	7
Hudson GH.....1935	6-3x5	.010	10 3/8B	3¼B	.006H	.008H	A	Ch-J7	.025	TC	TC	.020	Au	6	18	103	1 15/16	1⅜	3¼–3¾	.....	0–1/8	7
Hudson HT-HU-HHU-HTL1935	8-3x4½	.010	10 3/8B	4B	.006H	.008H	BA	Ch-J7	.025	TC	TC	.020	Au	7	23	104	1 15/16	1⅜	4–4½	1–1½	0–1/8	7
Hudson 63.....1936	6-3x5	.010	10 3/8B	4B	.006H	.008H	A	Ch-J8	.025	TC	TC	.020	Au	6	13	103	1 15/16	1⅜	3½–4½	1–1½	0–1/8	7
Hudson 64-5-6-7.....1936	8-3x4½	.010	10 3/8B	4B	.006H	.008H	BA	Ch-J8	.025	TC	TC	.020	Au	7	20	104	1 15/16	1⅜	3½–4½	1–1½	0–1/8	7
Hudson 73.....1937	6-3x5	.008	10 3/8B	4B	.008H	.010H	A	Ch-J8	.025	TC	TC	.020	Au	5	20	80	1 15/16	1⅜	0–½	1–1½	0–1/8	7
Hudson 74-5-6-7.....1937	8-3x4½	.008	10 3/8B	4B	.008H	.010H	BA	Ch-J8	.025	TC	TC	.020	Au	7	20	80	1 15/16	1⅜	0–½	1–1½	0–1/8	7
Hudson 89 (112).....1938	6-3x4⅛	.006	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	TC	TC	.020	Au	6	12⅛	115	1 15/16	1⅜	2–3	1–1½	0–1/8	7
Hudson 83.....1938	6-3x5	.006	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	TC	TC	.020	Au	6	12½	120	1 15/16	1⅜	2–3	1–1½	0–1/8	7
Hudson 84-5-7.....1938	8-3x4½	.006	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	TC	TC	.017	Au	9	17½	118	1 15/16	1⅜	2–3	1–1½	0–1/8	7
Hudson 90-98 (112).....1939	6-3x4⅛	.....	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	D	FM	.020	Au	6	12⅛	115	1 15/16	1⅜	1½±½	1–1½	0–1/8	7
Hudson 92-93.....1939	6-3x5	.....	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	TC	FM	.020	Au	6	12½	120	1 15/16	1⅜	1½±½	1–1½	0–1/8	7
Hudson 95-97.....1939	8-3x4½	.....	10 3/8B	4B	.006H	.008H	A	Ch-J8A	.032	TC	FM	.017	Au	9	17.2	118	1 15/16	1⅜	1½±½	1–1½	0–1/8	7

Tune Up Specifications—(1932 to 1939 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Intake Valve Opens Before or After T. C. — No. of Degrees (E = Exhaust Valve)	VALVES: Intake Valve Opens Before or After T. C. — No. of Flywheel Teeth (E = Exhaust Valve)	VALVES: Operating Tappet Clearance — Intake	VALVES: Operating Tappet Clearance — Exhaust	Rods Removed from	IGNITION: Spark Plug — Make and Model	IGNITION: Spark Plug — Gap	IGNITION: Timing — Spark Occurs—No. Deg. or Piston Travel	IGNITION: Timing — No. of Flywheel Teeth or Timing Marks	IGNITION: Timing — Breaker Gap	IGNITION: Timing — Breaker Housing	Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lb.) (Standard Head)	CRANK-PIN: Diameter	CRANK-PIN: Length	FRONT AXLE: Caster (Degrees)	FRONT AXLE: Camber (Degrees)	FRONT AXLE: Toe-in (Inches)	FRONT AXLE: Kingpin Inclination (Degrees)
Hudson-Terraplane 81-82..1938	6-3x5	.....	10½B	4B	.006	.008	A	Ch-J8A	.032	TC	TC	.020	Au	4½	12½	120	1⅛	1⅜	2-3	1-1½	0-⅛	7
Hupmobile C-221.....1932	8-3x4¾	.010	1B	½B	.007C	.014C	B	Ch-C7	.027	9B	2¾B	.019	A	9	20	80	2⅜	1	3L[5]	1		7¼
Hupmobile 225 & 237.....1932	8-3½x4¾	.010	1A	½A	.007C	.014C	A	Ch-C7	.027	9B	2¾B	.020	A	12	28	80	2⅜	1	3L[5]	1		7¼
Hupmobile S-214.....1932	6-3¼x4¼	.010	4A	1¼A	.008C	.008C	AB	Ch-C7	.026	TC	TC	.018	Re	6	14	76	2⅛	1	1½-2½L[5]	1	0-⅛	7½
Hupmobile L-218.....1932	8-2⅞x4⅝	.010	1A	½A	(m)	(m)	B	Ch-C7	.027	20B	6B	.020	A	6	16	80	2¼	1	1-2L[5]	1	0-⅛	7½
Hup. B-216 & B-316....1932-33	6-3⅜x4¼	.010	4A	1¼A	.006C	.008C	AB	Ch-C7	.029	10B	3B	.016	A	6	13	76	2⅛	1¼	1-2L	1	0-⅛	7½
Hup. F-222-2nd Series.....1932	8-2⅛x4⅝	.020	TC	TC	.018C	.018C	B	Ch-C7	.029	13B	4B	.021	A	6	21	87	2¼	1.14	1½-2½L	1¾	0-⅛	8
Hup. F-222-2nd Series.....1932	8-3x4⅝	.020	TC	TC	.018C	.018C	B	Ch-C7	.029	13B	4B	.021	A	6	21	87	2¼	1.14	1½-2½L	1¾	0-⅛	8
Hup. I-226-2nd Series.....1932	8-3⅛x4¾	.010	7-10A	2-3A	.007C	.015C	B	Ch-C7	.029	9B	2¾B	.021	A	9	24	89	2⅜	1¼	1½-2½L	1¾	0-⅛	8
Hup. K-321, KK-321A.....1933	6-3⅜x4¼	.014	2B	¾B	.010H	.013H	A	Ch-C7	.029	10B	3B	.016	A	6	16	76	2⅛	1¼	1-2L	1¼	0-⅛	8½
Hupmobile F-322.....1933	8-3x4⅝	.020	TC	TC	.018H	.018H	B	Ch-C7	.028	9B	2¾B	.021	A	6	24	89	2¼	1 5/32	1-2L	1¼	0-⅛	8½
Hupmobile I-326.....1933	8-3⅛x4¾	.020	3A	1A	.018H	.018H	B	Ch-C7	.029	9B	2¾B	.021	A	9	24	83	2⅜	1¼	1-2L	1¼	0-⅛	8½
Hupmobile 417W.....1934	6-3½x3⅞	.014	2B	¾B	.010C	.013C	A	Ch-C7	.028	7B	2B	.016	A	6	16	84	2⅛	1¼	1-2L	1¼	0-⅛	8½
Hupmobile 421J.....1934	6-3½x4¼	.014	2B	¾B	.010C	.013C	A	Ch-C7	.028	7B	2B	.016	A	6	16	93	2⅛	1¼	1-2L	1¼	0-⅛	8½
Hupmobile 427T.....1934	8-3⅜x4¾	.020	3A	1A	.020C	.020C	B	Ch-C7	.029	9B	2¾B	.021	A	8	24	95	2⅛	1¼	1-2L	1¼	0-⅛	8½
Hupmobile 518D.....1935	6-3½x4¼	.014	2B	½B	.010C	.013C	A	Ch-C7	.028	7B	2B	.016	A	6	20	110	2⅛	1¼	1½	1½	⅛ to ⅛	7½
Hupmobile 521O.....1935	8-3⅜x4¾	.020	3A	1A	.020C	.020C	B	Ch-C7	.029	9B	2¾B	.021	A	8	24	95	2⅛	1¼	1½	1¾	⅛ to ⅛	8½
Hupmobile 517W.....1935	6-3½x3⅞	.014	2B	¾B	.010C	.013C	A	Ch-C7	.028	7B	2B	.016	A	6	16	84	2⅛	1¼	1½	1¼	0-⅛	8½
Hupmobile 521J.....1935	6-3½x4¼	.014	2B	¾B	.010C	.013C	A	Ch-C7	.028	7B	2B	.016	A	6	16	93	2⅛	1¼	1½	1¼	0-⅛	8½
Hupmobile 527T.....1935	8-3⅜x4¾	.020	3A	1A	.020C	.020C	B	Ch-C7	.029	9B	2¾B	.021	A	8	24	95	2⅛	1¼	1½	1¼	0-⅛	8½
Hupmobile 618G.....1936	6-3½x4¼	.014	2B	½B	.010	.013	A	Ch-C7	.028	7B	2B	.018	A	6	18	110	2⅛	1¼	1½	1	⅛-⅛	7½
Hupmobile 621N.....1936	6-3⅜x4¾	.010	1A	¼A	.006	.013	B	Ch-C7A	.028	7B	2B	.016	A	8	21½	113	2⅜	1¼	1½	1¼	⅛-⅛	8½
Hupmobile 822E.....1938	6-3½x4¼	.014	2B	¾B	.010	.013	A	Ch-7	.027	7B	2¼B	.022	Au	6	18	141♣	2⅛	1¼	1½	1	⅛-⅛	8½
Hupmobile 825H.....1938	8-3⅛x4¾	.010	1A	¼A	.006	.013	B	Ch-7	.027	7B	2B	.015	Au	8	21½	142♥	2¼	1¼	1½	1¼	⅛-⅛	7½
Hupmobile 915R, 922E.....1939	6-3½x4¼	.014	2B	¾B	.010	.013	A	Ch-7	.028	7B	2¼B	.022	Au	6½	18	107	2⅛	1¼	1½	1	⅛-⅛	7½
Hupmobile 925H.....1939	8-3⅛x4¾	.010	1B	½B	.006	.013	B	Ch-7	.028	7B	2B	.015	Au	8½	21½	113	2¼	1¼	1½	1¼	⅛-⅛	8½
La Fayette 110.....1934	6-3¼x4¾	.....	.....	.....	.....	.012H	.012H	A	Ch-C15	.025	VDM	VDM	.020	Au	7	19	89	2	1 7/16	2½	1½	⅛	5
La Fayette 3510.....1935	6-3¼x4¾	.....	.....	.....	.....	.015H	.015H	A	Ch-C7	.025	VDM	VDM	.020	Au	7	19	85	2	1 13/64	2½	1½	⅛	7
La Fayette 3610.....1936	6-3¼x4⅜	.015	5A	1½A	.015H	.015H	A	AC-G8	.023	10B	3B	.020	Au	7	19	90	2	1 13/64	2½	1½	⅛	7
La Salle V8-345B.....1932	8-3⅜x4⅛	.006	6B	2B	.006C	.008C	B	AC-G7	.028	9B	3B	.020	Au	8	26	81	2⅜	2¼	2½-3½E	1½	⅛-¼	7¾
La Salle V8-345C.....1933	8-3⅜x4⅛	.006	6B	2B	.006C	.008C	B	AC-D8	.026	9B	3B	.021	Au	8	26	88	2⅜	2¼	2½-3½E	1½	⅛-¼	7¾
La Salle 350.....1934	8-3x4¼	.015	6A	2½A	.006C	.009C	B	AC-G6	.026	8B	3½B	.021	Au	7	19	105	2¼	1 3/4	1-2	¼-1	⅛-⅛	4½
La Salle 35-50, 36-50....1935-36	8-3x4⅜	.015	6A	2½A	.006C	.009C	B	AC-K9	.028	8B	3½B	.018	Au	7	16½	105	2¼	1 3/4	2	.....	⅛	4½
La Salle V8 37-50.....1937	8-3⅜x4½	.000	TC	TC	.000	.000	A	AC-K7	.025	5B	2¼B	.015	Au	7	25	105	2 3/32	2 3/32	¼-1	¼-1	⅛-⅛	4°-51′
La Salle V8 38-50.....1938	8-3⅜x4½	AA	TC	TC	AA	AA	A	AC-45	.027	5B	2¼B	.015	Au	7	25	155†	2 3/32	2 3/32	¾N-0	¼-1	⅛-⅛	4°-51′
La Salle V8 39-50.....1939	8-3⅜x4½	AA	TC	TC	AA	AA	A	AC-104	.027	5B	2¼B	.015	Au	7	25	155†	2 3/32	2 3/32	1¼N-2¼N	0-¾	⅛-⅛	5°-6′
Lincoln 501 to 510.....1932	8-3½x5	.003	2½B	1B	.003C	.004C	B	Ch-C4	.028	2A*	2A*	.029	A	10	34	80	2	2½	1-2	1	0-⅛	.....
Lincoln 231 to 250.....1932	12-3¼x4½	.003	21B	6¾B	.004C	.005C	B	Ch-2	.027	2A*	2A*	.020	A	12	34	84	2⅛	2¼	1-2	1	0-⅛	7½
Lincoln 511 to 520.....1933	12-3x4½	.003	21B	6¾B	.003C	.005C	B	Ch-2	.028	7B	2¼B	.018	A	11	32	89	2½	2	2	1	0-⅛	7½
Lincoln 251 to 270.....1933	12-3¼x4½	.003	21B	6¾B	.003C	.005C	B	Ch-2	.028	7B	2¼B	.018	A	12	34	83	2⅛	2¼	2	1	0-⅛	7½
Lin. 521 to 531, 271 to 290..1934	12-3¼x4½	.003	21B	6¾B	.003C	.005C	B	Ch-7	.022	7B	2¼B	.020	A	13	32	101	2⅝	2	1	1	0-⅛	7½
Lincoln 301, 541.....1935	12-3½x4½	.004	21B	6¾B	.004C	.006C	B	Ch-7	.022	7B	2¼B	.015	Au	12	32	95	2½	2	8	1	⅛-⅛	7½
Lincoln 321, 322.....1936	12-3½x4½	.004	21B	6¾B	.004C	.006C	B	Ch-7	.025	TC	TC	.020	Au	12	32	108	2½	2	1½	1	⅛-⅛	7½
Lincoln 351.....1937	12-3½x4½	AA	CSM	CSM	AA	AA	B	Ch-7	.025	TC	TC	.020	Au	12	32	108	2½	2	8	1	⅛-⅛	7½
Lincoln 401 to 425.....1938-39	12-3½x4½	AA	21B	6¾B	AA	AA	A	Ch-7	.029	7B	2¼B	.020	Au	12	32	105	2½	2	1½	1	⅛-⅛	7½
Lincoln Zephyr 900.....1936	12-2¾x3¾	.013	19½B	6B	.013C	.013C	A	Ch-J9	.025	4B	1¼B	.015	Au	6	27	105	2⅛	1.75	4½-9	¼-¾	⅛-⅛	8-8½
Lincoln Zephyr HB.....1937	12-2¾x3¾	.013	19½B	6B	.013C	.013C	A	Ch-J9	.029	4B	1¼B	.015	Au	6	27	105	2⅛	1.75	1½-6	¼-¾	⅛-⅛	3¾-4
Lincoln Zeph. 700, 96H..1938-39	12-2¾x3¾	AA	10.4B	4¼B	AA	AA	A	Ch-H10	.029	4B	1¼B	.015	Au	5	30	105	2⅛	1.75	1½-6	¼-¾	⅛-⅛	3¾-4
Marmon 70.....1932	8-2½x4¼	.010	6B	1½B	.008H	.008H	B	Ch-8	.025	7½B	2B	.020	A	6	16	89	2	1¼	4½E	1½	0-⅛	7
Marmon 16.....1932-33	16-3½x4	.014	6B	2B	.008H	.008H	B	Ch-C7	.022	6B	2B	.019	A	10	34	99	2⅜	1 3/32	4E	1½	0-⅛	7
Marmon 125.....1932	8-3¼x4¾	.010	TC	TC	.008H	.008H	B	Ch-8	.025	5¾B	1½B	.022	A	10	28	89	2⅜	1½	4	1½	0-⅛	7
Mercury 99A.....1939	8-3⅛x3¾	.013	TC	TC	.013C	.013C	A	Ch-H10	.025	4B	1¼B	.015	Au	5	21	100	2 3/4	1¾	4½-9	¼-1	1/16	8
Nash 960.....1932	6-3½x4⅜	.008	5A	1½A	.008H	.008H	A	AC-K12	.020	FM	FM	.022	Au	5	12	75	1¾	1 7/16	2-L[5]	0-1½	⅛	7
Nash 970.....1932	8-2⅞x4⅜	.008	5A	1½A	.008H	.008H	A	AC-K12	.020	FM	FM	.022	A	6	15	75	1⅞	1⅛	2-L[5]	0-1½	⅛	7
Nash 980-Twin. Ign. 8.....1932	8-3x4¼	.012	15A	4¾A	.012H	.012H	B	AC-K12	.020	15B	4¾B	.020	A	8	20	82	2	1 11/64	2—L[5]	0-1½	⅛	7
Nash 990-Twin. Ign. 8.....1932	8-3½x4½	.012	15A	4¾A	.012H	.012H	B	AC-J9	.020	VDM	VDM	.020	A	10	22	82	2⅛	1⅜	0-L[9]	0-1½	⅛	6
Nash 1060-Big Six.....1932	6-3½x4⅜	.008	5½A	1¾A	.008H	.008H	A	AC-G10	.020	VDM	VDM	.020	Au	6	15	75	2	1 7/16	2½	0-1½	⅛	7
Nash 1080-Special 8.....1932	8-3½x4¼	.012	15A	4¾A	.012H	.012H	B	AC-K12	.020	VDM	VDM	.020	A	8	21	75	1⅞	1⅛	0	0-1½	⅛	7
Nash 1090-Twin. Ign. 8.....1932	8-3½x4½	.012	15A	4¾A	.012H	.012H	B	AC-J9	.020	VDM	VDM	.020	A	10	22	82	2	1¼	0	0-1½	⅛	6
Nash 1070-Standard.....1932	8-3x4⅜	.008	5A	1½A	.008H	.008H	A	AC-G10	.022	5A	1½A	.020	A	7	17	75	1⅞	1⅛	2½	0-1½	⅛	7
Nash 1170-Special 8.....1933	8-3x4⅜	.008	5A	1½A	.008H	.008H	A	AC-G10	.022	5A	1½A	.020	A	7	17	75	1⅞	1⅛	2½	0-1½	⅛	7
Nash 1120-Big Six.....1933	6-3¼x4⅜	.....	CSM	CSM	.008H	.008H	A	AC-K12	.022	10B	3B	.020	Au	7	19	84	2	1 7/16	2½	0-1½	⅛	7
Nash 1130-Standard 8.....1933	8-3x4⅜	.008	5A	1½A	.008H	.008H	A	AC-G10	.022	10B	3B	.020	Au	7	16	84	1⅞	1⅛	2½	0-1½	⅛	7
Nash 1180-Adv. Twn. Ign. 8.1933	8-3½x4¼	.012	15A	4¾A	.012H	.012H	B	AC-K12	.020	VDM	VDM	.020	A	8	21	80	2	1¼	0	0-1½	⅛	7
Nash 1190-Amb.Twn.Ign.8..1933	8-3½x4½	.012	15A	4¾A	.012H	.012H	B	AC-J9	.020	VDM	VDM	.020	A	10	22	80	2⅛	1⅜	0	0-1½	⅛	6
Nash 1220-Big Six Twn. Ign. 1934	6-3⅜x4⅜	.015	CSM	CSM	.015H	.015H	A	AC-K12	.022	VDM	VDM	.020	A	7	17½	82	2	1 11/64	2½	0-1½	⅛	7
Nash 1280-Adv. Twn. Ign. 8 1934	8-3½x4¼	.015	CSM	CSM	.015H	.015H	A	AC-K12	.022	VDM	VDM	.018	Au	8	21	82	2	1 7/64	2½	0-1½	⅛	7
Nash 1290-Amb. Twn. Ign. 8 1934	8-3½x4½	.015	CSM	CSM	.015H	.015H	B	AC-J9	.022	VDM	VDM	.018	....	10	22	82	2⅛	1⅜	0	0-1½	⅛	6
Nash 3520-Adv. Twn. Ign. 6 1935	6-3⅜x4⅜	.015	CSM	CSM	.015H	.015H	A	AC-K12	.025	VDM	VDM	.020	....	7	17½	89	2	1 13/64	2½	0-1½	⅛	7
Nash 3580-88 Twn. Ign. 8 .1935	8-3½x4¼	.015	CSM	CSM	.015H	.015H	B	AC-K12	.025	VDM	VDM	.018	....	8	21	80	2	1 7/64	2½	0-1½	⅛	7
Nash 3640-400-Std. 6...1935-36	6-3⅜x4⅜	.....	CSM	CSM	.015H	.015H	A	AC-G8	.025	VDM	VDM	.020	Au	7	18	83	2	1 19/64	2½	0-1½	⅛	7
Nash 3640A-400 DeL. 6.....1936	6-3⅜x4⅜	.015	CSM	CSM	.015H	.015H	A	AC-G8	.025	VDM	VDM	.020	Au	7	18	83	2	1 19/64	2½	0-1½	⅛	7
Nash 3620-Amb. Twn. Ign. 6 1936	6-3⅜x4⅜	.015	CSM	CSM	.015H	.015H	A	AC-K7	.025	VDM	VDM	.020	Au	7	17½	93	2	1 7/64	2½	0-1½	⅛	7
Nash 3680-Amb. Twn. Ign. 8 1936	8-3½x4¼	.015	CSM	CSM	.015H	.015H	B	AC-K12	.025	VDM	VDM	.018	Au	7	21	81	2	1 7/64	2½	0-1½	⅛	7
Nash 3720-Ambassador 6...1937	6-3⅜x4⅜	.008	24B	4¼B	.008H	.015H	A	AC-45	.027	4B	VDM	.022	Au	7	17	93	2	1 27/64	2½	1½	⅛	7
Nash 3780-Ambassador 8...1937	8-3½x4¼	.008	20B	7½B	.008H	.015H	B	AC-45	.027	9B	VDM	.020	Au	7	18	93	2	1 15/64	2	1½	⅛	7
Nash 3820-Amb. 6.....1938	6-3½x4⅜	.008	CSM	CSM	.008H	.015H	A	AC-45	.025	4B	VDM	.022	Re	7	20	125△	2	....	1½	1½	0	7
Nash 3880-Amb. 8.....1938	8-3½x4¼	.015	CSM	CSM	.015H	.015H	B	AC-45	.025	9B	VDM	.015	Re	7	18	110△	2	1 15/64	1½	1½	0	7
Nash 3920-Amb. 6.....1939	6-3⅜x4⅜	.015	24½B	CSM	.015H	.015H	A	AC-45	.025	6B	VDM	.020	Au	6	16	125△	2	1 27/64	1½	1½	0-⅛	7
Nash 3980-Amb. 8.....1939	8-3½x4¼	.015	20B	CSM	.015H	.015H	B	AC-45	.025	9B	VDM	.020	Au	7	17	110△	2	1 15/64	1½	1½	0-⅛	7
Nash Lafayette 3710-400...1937	6-3⅜x4⅜	.015	5A	1½A	.015H	.015H	A	AC-G8	.025	TC	VDM	.022	Au	6	20	90	2	1 27/64	2½	1½	⅛	7
Nash Lafayette 3810.....1938	6-3⅜x4⅜	.015	CSM	CSM	.015H	.015H	A	A-B7A	.025	4A	VDM	.022	Re	6	20	125△	2	1 27/64	1½	1½	0	7
Nash Lafayette 3910.....1939	6-3⅜x4⅜	.015	21½B	CSM	.015H	.015H	A	A-B7A	.025	TC	VDM	.020	Au	6	20	110	2	1 27/64	1½	1½	0-⅛	7
Oldsmobile F-32.....1932	6-3⅛x4⅛	.010	TC	TC	.008H	.010H	A	AC-G9	.025	5B	2B	.021	Au	6	16¼	83	1⅞	1⅜	3½L[10]	1¾	⅛-⅛	9½
Oldsmobile L-32.....1932	8-3x4¼	.010	TC	TC	.008H	.010H	B	AC-G9	.025	5B	2B	.021	Au	7	16⅓	89	2¼	1⅜	3½L[10]	1¾	⅛-⅛	9½
Oldsmobile F-33.....1933	6-3⅜x4⅛	.010	TC	TC	.008H	.010H	A	AC-G9	.025	3½B	1½B	.021	Au	6	17	83	1⅞	1⅜	2½	1¾	⅛-⅛	9½

Tune Up Specifications—(1932 to 1939 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Intake Valve Opens Before or After T. C. — No. of Degrees (E=Exhaust Valve)	VALVES: Intake Valve Opens Before or After T. C. — No. of Flywheel Teeth (E=Exhaust Valve)	VALVES: Operating Tappet Clearance — Intake	VALVES: Operating Tappet Clearance — Exhaust	Rods Removed from	IGNITION: Spark Plug — Make and Model	IGNITION: Spark Plug — Gap	IGNITION: Timing — Spark Occurs—No. Deg. or Piston Travel	IGNITION: Timing — No. of Flywheel Teeth or Timing Marks	IGNITION: Timing — Breaker Gap	IGNITION: Timing — Breaker Housing	Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lb.) (Standard Head)	CRANK-PIN: Diameter	CRANK-PIN: Length	FRONT AXLE: Caster (Degrees)	FRONT AXLE: Camber (Degrees)	FRONT AXLE: Toe-in (Inches)	FRONT AXLE: Kingpin Inclination (Degrees)
OLDSMOBILE—Cont.																						
Oldsmobile L-33	1933 8-3x4¼	.010	TC	TC	.008H	.010H	B	AC-G9	.025	3½B	1½B	.021	Au	7	19	89	2¼	1⅜	2½	1¾	1/8–3/16	9½
Oldsmobile F-34	1934 6-3⅛x4½	.013	TC	TC	.008H	.010H	A	AC-G9	.025	VDM	VDM	.021	Au	6	15	93	1⅞	1⅜	2½–3E	¼–1	1/8–1/32	4⅝
Oldsmobile L-34	1934 8-3x4¼	.010	TC	TC	.008H	.010H	B	AC-G9	.025	VDM	VDM	.021	Au	7	19	93	2¼	1⅜	1½–2E	¼–1	1/8–1/32	4⅝
Oldsmobile F-35	1935 6-3⅛x4½	.010	5B	2B	.008H	.010H	A	AC-G9	.025	2B	1B	.021	Au	6	13	99	2	1⅜	1½–2¼	⅛–1	1/8–3/16	5
Oldsmobile L-35	1935 8-3x4¼	.010	TC	TC	.008H	.010H	B	AC-G9	.025	3B	1B	.021	Au	7	16	103	2¼	1⅜	1½–2¼	⅛–1	1/8–3/16	5
Oldsmobile F-36	1936 6-3⅛x4½	.010	5B	2B	.008H	.010H	A	AC-G9	.033	TC	TC	.020	Au	6	13	99	2	1⅜	1½–2¼	⅛–1	1/8–3/16	5⅝
Oldsmobile L-36	1936 8-3x4¼	.010	TC	TC	.008H	.010H	B	AC-G9	.030	2B	1B	.015	Au	7	16	103	2¼	1⅜	1½–2¼	⅛–1	1/8–3/16	5⅝
Oldsmobile F-37	1937 6-3⅛x4½	.0125	5B	2B	.008H	.011H	A	AC-K9	.040	TC	TC	.020	Au	6	16	101	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile L-37	1937 8-3¼x3⅞	.0125	TC	TC	.008H	.011H	A	AC-K9	.030	2B	1B	.015	Au	7	20	103	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile F-38	1938 6-3⅛x4½	(n)	5B	2B	.008H	.011H	A	AC-45	.040	TC	TC	.020	Au	6	17	146†	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile L-38	1938 8-3¼x3⅞	(n)	TC	TC	.008H	.011H	A	AC-45	.030	2B	¾B	.015	Au	7	21	152†	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile 60	1939 6-3⅛x3⅞	.011	5B	2B	.008H	.011H	A	AC-45	.040	TC	TC	.020	Au	5	17	151†	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile 70	1939 6-3⅛x4½	.011	5B	2B	.008H	.011H	A	AC-45	.040	TC	TC	.020	Au	5	17	146†	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Oldsmobile 80	1939 8-3¼x3⅞	.011	TC	TC	.008H	.011H	A	AC-45	.030	2B	¾B	.015	Au	6	24	152†	2⅛	1⅜	0–N¾	⅛–1	1/8–3/16	4⅝
Overland 39	1939 4-3½x4⅝	.020	9B	2½B	.014C	.014C	A	Ch-J8	.025	TC	TC	.020	Au	4	11¾	105	1 11/16	1 1/16	3	2	1/16–1/8	7½
Packard 900-Light 8	1932 8-3⅛x5	.004	20B	6½B	.004H	.004H	(r)	AC-K9	.025	9B	3B	.018	Au	8	19	99	2 3/16	1 3/32	1–L11	1½	1/8	8½
Packard 901, 902-Standard	1932 8-3⅛x5	.004	20B	6½B	.004H	.004H	(r)	AC-K9	.025	9B	3B	.018	Au	8	20	99	2 3/16	1 3/32	1–L11	1½	1/8	8½
Packard 903, 904-DeLuxe	1932 8-3½x5	.004	20B	6½B	.004H	.004H	A	AC-K9	.025	9B	3½B	.018	Au	10	26	99	2 3/16	1¼	1–L11	1½	1/8	8½
Packard 905, 906-V12	1932 12-3⅛x4	.000	TC	TC	AA	AA	(r)	AC-K9	.025	7½B	2½B	.020	Au	8	40	99	2½	2¼	1–L11	1½	1/8	8½
Packard 1001, 1002-Stand.	1933 8-3⅛x5	.004	30B	10B	.004H	.004H	(r)	AC-K7	.025	7½B	2½B	.020	Au	8	20	99	2 3/16	1 3/32	3¼	1½	0–1/16	8½
Packard 1003, 1004-Sup. 8	1933 8-3½x5	.004	30B	10B	.004H	.004H	A	AC-K7	.025	7½B	2½B	.020	Au	10	20	99	2 3/16	1¼	3¼	1½	0–1/16	8½
Packard 1005, 1006-V12	1933 12-3⅞x4	.000	TC	TC	AA	AA	(r)	AC-K7	.025	5½B	1¾B	.020	Au	10	40	99	2½	2¼	1½	1½	0–1/16	8½
Packard 1100, 1101, 1102	1934 8-3⅜x5	.004	30B	10B	.004H	.006H	(r)	AC-K7	.025	6B	2B	.020	Au	8	20	99	2 3/16	1 3/32	1	1	0–1/16	9
Packard 1103, 4, 5-Super 8	1934 8-3½x5	.004	30B	10B	.004H	.006H	A	AC-K7	.025	6B	2B	.020	Au	10	20	99	2 3/16	1¼	1	1	0–1/16	9
Packard 1107, 1108-V12	1934 12-3⅞x4	.000	TC	TC	AA	AA	(r)	AC-K7	.025	8B	2½B	.020	Au	10	40	99	2½	2¼	1½	1	0–1/16	9
Packard 1200, 1, 2	1935 8-3⅛x5	.004	30B	10B	.004H	.006H	(r)	CA-J8-K7	.025	6B	2B	.020	Au	8	20	110	2 3/16	1 3/32	1½	1	0–1/16	9
Packard 1203, 4, 5-Super 8	1935 8-3½x5	.004	30B	10B	.004H	.006H	A	CA-J8-K7	.025	6B	2B	.020	Au	9½	22	105	2 3/16	1¼	1½	1	0–1/16	9
Packard 1207, 8-V12	1935 12-3⅞x4¼	.000	TC	TC	AA	AA	(r)	AC-K7	.025	8B	2½B	.020	Au	10	40	108	2½	2¼	1½	1	0–1/16	9
Packard 120, 120A	1935 8-3¼x3⅞	.007	5B	2B	.007H	.009H	A	AC-K7	.030	7B	2¾B	.020	Au	7	16½	110	2 3/32	1⅜	2	1	0–1/8	1½
Packard 120B	1936 8-3¼x4¼	.006	7B	2¾B	.007H	.010H	A	CA-J8-K7	.029	7B	2¾B	.020	Au	7	18	110	2 3/32	1¾	2	1	1/16–1/8	1½
Packard 1400, 1, 2	1936 8-3⅜x5	.004	30B	10B	.004H	.006H	(r)	CA-J8-K7	.029	6B	2B	.020	Au	8	20	110	2 3/16	1 3/32	1	1	0–1/16	9
Packard 1403, 4, 5-Super 8	1936 8-3½x5	.004	30B	10B	.004H	.006H	A	CA-J8-K7	.029	6B	2B	.020	Au	9½	22	110	2 3/16	1¼	1	1	0–1/16	9
Packard 1407, 8-V12	1936 12-3⅞x4¼	.000	TC	TC	AA	AA	(r)	CA-J8-K7	.029	8B	2½B	.020	Au	10	40	110	2½	2¼	1	1	0–1/16	9
Packard 115C	1937 6-3⅞x4¼	.....	5B	2B	.007H	.010H	A	AC-Y4°	.028	4B	1½B	.015	Au	7	17	105	2 3/32	1¼	2½±½	1±¼	1/16±1/16	1½
Packard 120C	1937 8-3¼x4¼	.....	5B	2B	.007H	.010H	A	AC-Y4°	.028	7B	2¾B	.015	Au	7	20	110	2 3/32	1¼	2½±½	1±¼	1/16±1/16	1½
Packard 1500, 1, 2-Super 8	1937 8-3⅜x5	.....	30B	12½B	.004H	.006H	(r)	AC-Y4°	.028	6B	2½B	.015	Au	8	24	108	2 3/16	1 3/32	2½±½	1±¼	1/16±1/16	1½
Packard 1506, 7, 8-V12	1937 12-3⅞x4¼	.000	TC	TC	AA	AA	(r)	AC-Y4°	.028	6B	2B	.020	Au	10	40	108	2½	2¼	0–1/6N	1±¼	1/8±1/16	1½
Packard 1600	1938 6-3½x4¼	.....	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	2½B	.020	Au	6	15	110	2 3/32	1¼	1½±½	½±½	0+1/16–0	1°54′
Packard 1601, 2	1938 8-3¼x4¼	.....	1B	½B	.007H	.010H	A	Ch-Y4°	.028	8B	3B	.015	Au	6	16	110	2 3/32	1¼	1½±½	½±½	0+1/16–0	1°54′
Packard 1603, 4, 5-Super 8	1938 8-3⅜x5	.....	30B	12½B	.006H	.008H	(r)	Ch-Y4°	.028	6B	2½B	.015	Au	8	20	110	2 3/16	1 3/32	2½±½	1±¼	1/16+1/16–0	1½
Pack. 1607, 8; 1706, 7, 8	1938-39 12-3⅞x4¼	.....	TC	TC	AA	AA	(r)	Ch-Y4°	.028	6B	2B	.020	Au	10	40	110	2½	1 1/16	0+0–½	1±¼	1/16+1/16–0	1½
Packard 1700	1939 6-3½x4¼	.0125	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	2½B	.020	Au	5	15.2	.....	2 3/32	1¼	1½±½	½+¾–0	0+1/16–0	1°54′
Packard 1701, 2	1939 8-3¼x4¼	.0125	1B	½B	.007H	.010H	....	Ch-Y4°	.028	8B	3B	.015	Au	6	16	.....	2 3/32	1¼	1½±½	½+¾–0	0+1/16–0	1°54′
Packard 1703, 5	1939 8-3 3/16x5	.005	26B	10⅔B	.006H	.008H	....	Ch-Y4°	.028	7B	3B	.015	Au	7½	22	.....	2 3/16	1 3/32	0+½	½+¾–0	0+1/16–0	1°54′
Pierce-Arrow 54	1932 8-3½x4¾	.004	5B	1½B	.004H	.006H	A	Ch-C4	.022	8B	2½B	.018	A	9	26	76	2¼	1¼	1–1½	1	3/16	8
Pierce-Arrow 52-V12	1932 12-3⅝x4	.004	4B	1½B	.004H	.006H	A	Ch-N2	.022	8B	2½B	.018	A	10	38	76	2⅛	2⅛	1–1½	1	1/16	8
Pierce-Arrow 53-V12	1932 12-3¼x4	.004	4B	1½B	.004H	.006H	A	Ch-N2	.022	8B	2½B	.018	A	10	38	76	2⅛	2⅛	1–1½	1	1/16	8
Pierce-Arrow 836	1933 8-3½x4¾	.000	5A	1½A	AA	AA	A	Ch-C4	.025	5B	1⅛B	.018	A	9	26	89	2¼	1¼	2–2½L11	½–1½	1/8–¼	8
Pierce-Arr. 1242, 1247-V12	1933 12-3½x4	.000	19B	6B	AA	AA	A	Ch-N2	.023	5B	1½B	.018	A	10	38	99	2⅛	2¼	2–2½L11	½–1½	1/8–¼	8
Pierce-Arrow 840A	1934 8-3½x5	.000	5A	1½A	AA	AA	A	Ch-J5	.023	FM	FM	.018	A	9	26	83	2¼	1¼	½–1L11	½–1½	¼	8
Pierce-Arrow 1240A-48A	1934 12-3½x4	.000	19B	6B	AA	AA	A	Ch-J5	.023	FM	FM	.018	A	12	40	100	2⅛	2¼	½–1L11	½–1½	¼	8
Pierce-Arrow 836A	1934 8-3½x4¾	.006	5B	1½B	.004	.006	A	Ch-J5	.023	FM	FM	.020	A	9	26	83	2⅛	1¼	¾	1	¼	8
Pierce-Arrow 845	1935 8-3½x5	.....	5A	1½A	AA	AA	A	Ch-J5C	.023	FM	FM	.018	A	9	26	80	2¼	1¼	¾	1	¼	8
Pierce-Arrow 1245, 55-V12	1935 12-3½x4	.....	19B	5B	AA	AA	A	Ch-J5	.023	FM	FM	.018	A	12	40	100	2⅛	2¼	¾	1	¼	8
Pierce-Arrow 1601	1936 8-3½x5	.010	5A	1½A	AA	AA	A	Ch-J6	.023	2B	½B	.018	A	9	25	80	2¼	1¼	¾	1	¼	8
Pierce-Arrow 1602-03	1936 12-3¼x4	.004	19B	6B	AA	AA	A	Ch-J6	.023	5B	1½B	.018	A	11	38	85	2⅛	2¼	¾	1	¼	8
Pierce-Arrow 1701, 1801	1937-38 8-3½x5	.010	5A	1½A	AA	AA	A	Ch-J6	.025	2B	½B	.018	A	10	25	80	2¼	1¼	1¼	1	⅜	8
Pierce-Arrow V12	1937-38 12-3½x4	.004	19B	6B	AA	AA	A	Ch-J6	.025	5B	1½B	.018	A	13	38	85	2⅜	1⅜	1¼	1	⅜	8
Plymouth PA	1932 4-3⅝x4¾	.008	6A	2A	.005H	.007H	A	AC-G12	.028	10⅔B	3½B	.020	A	6	14½	74	2	1⅜	1–3	¼–¾	0–1/16	7
Plymouth PB	1932 4-3⅝x4¾	.008	6A	2A	.005H	.007H	A	AC-S9	.028	10B	FM	.020	Au	6	14½	74	2	1⅜	1–3	¼–¾	0–1/16	7
Plymouth PC & PC-Std.	1932-33 6-3⅛x4½	.011	6A	2½A	.005H	.007H	A	AC-S9	.025	(l)	(l)	.020	Au	5	13	90	1 1/16	1	1–3	¼–¾	0–1/16	9
Plymouth PD	1933 6-3½x4½	.011	6A	2½A	.005H	.007H	A	AC-S9	.025	TC	TC	.020	Au	5	13	90	1 1/16	1	1–3	¼–¾	0–1/16	9
Plymouth PE	1934 6-3½x4⅜	.011	6A	VDM	.005H	.007H	A	AC-S9	.025	3A	VDM	.020	Au	5	16	95	1 1/16	1	½–2½	¼–¾	1/16–⅛	9
Plymouth PF	1934 6-3½x4⅜	.011	6A	FM	.005H	.007H	A	AC-S9	.025	9B	FM	.020	Au	5	14	95	1 1/16	1	½–2½	¼–¾	1/16–⅛	9
Plymouth PG	1934 6-3½x4⅜	.011	6A	FM	.005H	.007H	A	AC-S9	.025	3B	FM	.020	Au	5	14	95	1 1/16	1	1–3	¼–1	1/16–⅛	9
Plymouth PJ, PJ* DeL	1935 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	AC-K9	.025	4A	VDM	.020	Au	5	15	114	1 1/16	1	1–3	¼–¾	0–1/8	8½
Plymouth P1, P2	1936 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	AC-K9	.025	4A	VDM	.020	Au	5	15	114	1 1/16	1	1–3	¼–¾	0–1/8	9½
Plymouth P3, P4	1937 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	4A	VDM	.020	Au	5	15	114	1 1/16	1	1–3	¼–¾	0–1/8	4½–5½
Plymouth P5	1938 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	4A	VDM	.020	Au	5	14	145†	1 1/16	1	3–5	¼–¾	0–1/8	4½–5½
Plymouth P6	1938 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	A-A7	.025	4A	VDM	.020	Au	5	14	145†	1 1/16	1	1–3	¼–¾	0–1/8	4½–5½
Plymouth P7	1939 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.020	Au	5	14	145†	1 1/16	1	½N–1½P	¼N–½P	0–1/8	5¼–6½
Plymouth P8	1939 6-3½x4⅜	.011	6A	VDM	.006H	.008H	A	A-A7	.025	TC	VDM	.020	Au	5	14	145†	1 1/16	1	½N–1½P	¼N–½P	0–1/8	5¼–6½
Pontiac 402	1932 6-3⅜x3⅞	.010	TC	TC	.010H	.010H	A	AC-K12	.022	8B	3B	.022	Au	6	14	74	2	1 5/16	.....	.....	.....	.....
Pontiac 302-V8	1932 8-3⅞x3⅜	.015	TC	TC	.012H	.012H	A	AC-K12	.022	11B	4½B	.016	Au	7	25	80	2¼	2¾	1½–2½E	1¾	0–1/16	9½
Pontiac 601	1933 8-3⅛x3½	.012	5B	2B	.010H	.010H	A	AC-K9	.025	6½B	2½B	.017	Au	7	15	93	2	1 3/16	1½–2½E	1½	5/64–3/64	7⅛
Pontiac 603	1934 6-3⅛x3½	.012	5B	2B	.010H	.010H	A	AC-K7	.025	6½B	2½B	.018	Au	7	15	103	2	1 3/16	¼N–½P	1–2	3/32–⅞	7
Pontiac 701A-Standard	1935 6-3⅝x3⅞	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	13½	103	2	1 1/16	0–E	1–2	0–1/16	7
Pontiac 701B-DeLuxe	1935 6-3⅝x3⅞	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	13½	103	2	1 1/16	0–E	1–2	0–1/16	7
Pontiac 605	1935 8-3⅛x3½	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.018	Au	7	14	103	2	1 1/16	0–E	1–2	0–1/16	7
Pontiac 36-26BB-Master 6	1936 6-3⅜x3⅞	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	15	103	2	1 1/16	0–1½	1¼–1¾	0–1/8	7⅛
Pontiac 36-26BA-DeLuxe 6	1936 6-3⅜x3⅞	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	15	103	2	1 1/16	0	0–¼	0–1/16	8¾
Pontiac 36-8BA-Eight	1936 8-3¼x3½	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.018	Au	7	16¾	103	2	1 1/8	0	0–¼	0–1/16	8¾
Pontiac 37-26CA	1937 6-3⅛x4	.015	5B	2B	.012H	.012H	A	AC-K7	.025	4B	FM	.019	Au	6	16	103	2	1 1/8	¾N–1¼N	¾–1¼	0	4½–5
Pontiac 37-28CA	1937 8-3¼x3¾	.015	5B	2B	.012H	.012H	A	AC-K7	.025	4B	FM	.016	Au	7	19	103	2	1 1/16	¾N–1¼N	¾–1¼	0–1/16	4½–5
Pontiac 38-26DA	1938 6-3⅛x4	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.020	Au	6	16	141†	2	1 1/8	¾N–1¼N	¾–1¼	0	4°51′
Pontiac 38-28DA, 39-28	1938-39 8-3¼x3¾	.015	5B	2B	.012H	.012H¶	A	AC-45	.025	4B	FM	.015	Au	7	19	141†	2	1 1/16	¾N–1¼N	¾–1¼	0–1/16	4°51′
Pontiac 39-25, 39-26	1939 6-3⅛x4	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	17	141†	2⅛	1 3/32	½N–1N	½–1	0–1/16	4°51′

Tune Up Specifications—(1932 to 1939 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Intake Valve Opens Before or After T. C. — No. of Degrees (E=Exhaust Valve)	VALVES: Intake Valve Opens Before or After T. C. — No. or Flywheel Teeth (E=Exhaust Valve)	VALVES: Operating Tappet Clearance — Intake	VALVES: Operating Tappet Clearance — Exhaust	Rods Removed from	IGNITION: Spark Plug — Make and Model	IGNITION: Spark Plug — Gap	IGNITION: Timing — Spark Occurs—No. Deg. or Piston Travel	IGNITION: Timing — No. of Flywheel Teeth or Timing Marks	IGNITION: Timing — Breaker Gap	IGNITION: Timing — Breaker Housing	Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lb.) (Standard Head)	CRANK-PIN: Diameter	CRANK-PIN: Length	FRONT AXLE: Caster (Degrees)	FRONT AXLE: Camber (Degrees)	FRONT AXLE: Toe-In (Inches)	FRONT AXLE: Kingpin Inclination (Degrees)
Reo 6-25-Fly. Cld. 1932	6-3⅜x5	.012	TC	TC	.007H	.007H	B	Ch-C7	.025	8B	2¼B	.020	A	6	19	84	2 1/16	1½	3½L[5]	1½	⅛	8
Reo 8-25-Fly. Cld. 1932	8-3x4¾	.012	4B	1¼B	.007H	.007H	B	Ch-C7	.025	5B	1½B	.020	A	8	16	85	2 3/16	1 7/16	3½L[5]	1½	⅛	8
Reo 8-31-Royale 1932	8-3⅜x5	.012	TC	TC	.008H	.008H	(r)	Ch-C7	.025	8¼B	2¼B	.020	A	8	23	84	2 3/16	1½	3½	1½	0–1/16	8
Reo S-Flying Cloud 1932	6-3⅛x5	.012	TC	TC	.007H	.007H	(r)	Ch-C7	.025	7¾B	2½B	.020	A	6	20	84	2 1/16	1½	3½	1½	0–1/8	8
Reo 8-35 & 8-52-Royale 1932	8-3⅜x5	.012	TC	TC	.008H	.008H	(r)	Ch-C7	.025	8¼B	2¼B	.020	A	8	23	84	2 1/16	1½	3½	1½	0–1/8	8
Reo S2-Flying Cloud 1933-34	6-3⅜x5	.012	TC	TC	.007H	.007H	(r)	Ch-C7	.025	6B	2B	.020	A	6	20	84	2 1/16	1½	3½	1½	0–1/8	8
Reo N1-Royale 1933-34	8-3⅜x5	.012	TC	TC	.007H	.007H	(r)	Ch-C7	.025	.....	FM	.020	A	8	25	84	2 1/16	1½	3½	1½	0–1/8	8
Reo N2-Royale 1933-34	8-3⅜x5	.012	TC	TC	.007H	.007H	(r)	Ch-C7	.025	.....	FM	.020	A	8	25	84	2 1/16	1½	3½	1½	0–1/8	8
Reo 4S & 5S-Flying Cloud 1934	6-3⅜x5	.012	TC	TC	.007H	.008H	B	Ch-C7	.025	6B	2B	.020	Au	6	20	80	2 1/16	1½	3½	1½	0–1/8	8
Reo 7S-Royale 1935	6-3⅜x5	.012	TC	TC	.007H	.008H	B	Ch-C7	.025	10B	3¼B	.020	Au	6	20	80	2 1/16	1½	4	1½	0–1/8	8
Reo 6A-Flying Cloud 1935	6-3⅜x4¼	.012	TC	TC	.007H	.008H	(r)	Ch-C7A	.025	2B	1¼B	.020	Au	6	18	90	2 1/16	1½	1½	1½	0–1/16	8
Reo 6D-Flying Cloud 1936	6-3⅜x4¼	.012	5B	2B	.007H	.008H	(r)	Ch-C7A	.025	2B	1¼B	.020	Au	6	19	85	2 1/16	1½	1½	1½	⅛	8
Rockne 65 1932	6-3⅛x4½	.010	5B	1½B	.004H	.006H	A	Ch-2	.025	.....	FM	.020	A	5	12	80	1 1/16	1¼	¼–¾E	1½	1/16–⅛	7
Rockne 75 1932	6-2⅞x4½	.010	5A	1½A	.004H	.006H	A	Ch-2	.025	5B	1½B	.020	A	7	14	76	2 1/16	1½	¼–¾E	0–1	1/16–⅛	8
Rockne 75 1932	6-3¼x4½	.010	5A	1½A	.004H	.006H	A	Ch-2	.025	5B	1½B	.020	A	7	14	76	2 1/16	1½	¼–¾E	0–1	1/16–⅛	8
Rockne 10 1933	6-3⅛x4⅛	.010	5B	1½B	.004H	.006H	A	Ch-C7	.025	TC	TC	.020	A	5	12	89	1 1/16	1¼	¼–¾E	1½	1/16–⅛	9½
Studebaker 6-55 1932	6-3¼x4⅝	.010	5A	1½A	.004H	.006H	A	Ch-2	.025	5B	1½B	.021	A	7	12½	76	2 1/16	1½	¼–¾E	0–1	1/16–⅛	8
Studebaker 8-62-Dictator 1932	8-3 1/16x3¾	.010	TC	TC	.004H	.006H	A	Ch-2	.025	9B	2¼B	.020	A	6½	14	76	1 1/16	1 1/16	¼–¾E	0–1	1/16–⅛	8
Studebaker 8-71-Com. 1932	8-3 1/16x4¼	.010	15B	4¼B	.004H	.006H	A	Ch-2	.025	9B	2¼B	.020	A	6½	16	80	1 1/16	1 1/16	¼–¾E	0–1	1/16–⅛	8
Studebaker 8-91-President 1932	8-3½x4⅜	.010	5A	1½A	.004H	.006H	A	Ch-2	.025	9B	2¼B	.020	A	8	21	78	2 1/16	1 1/16	¼–¾E	0–1	1/16–⅛	8
Studebaker 6-56 1933	6-3¼x4⅝	.010	5A	1½A	.004H	.006H	A	Ch-8	.025	TC	TC	.020	A	6	14	89	2 1/16	1½	½–1½E	0–1	1/16–⅛	8
Studebaker 8-73-Com. 1933	8-3 1/16x4	.010	15B	4¼B	.004H	.008H	A	Ch-2	.025	4B	1¼B	.020	A	6½	16	89	1 7/8	1 1/16	½–1½E	0–1	1/16–⅛	8
Studebaker 8-82-President 1933	8-3 1/16x4¼	.010	15B	4¼B	.004H	.008H	A	Ch-8	.025	4B	1¼B	.020	A	6½	18	89	1 7/8	1 1/16	½–1½E	0–1	1/16–⅛	8
Studebaker 8-92 President 1933	8-3½x4⅜	.010	5A	1½A	.004H	.006H	A	Ch-8	.025	TC	TC	.020	A	8	23	89	2¼	1¼	½–1½E	0–1	1/16–⅛	8
Studebaker A-Dictator 1934	6-3¼x4⅛	.010	15B	4¼B	.004H	.006H	A	Ch-7	.025	TC	TC	.020	Au	5	15.6	105	2 1/16	1⅜	1–1½E	1½	1/16–⅛	9½
Studebaker B-Commander 1934	8-3 1/16x3¾	.010	15B	4¼B	.004H	.006H	A	Ch-7	.025	TC	TC	.020	Au	6½	18.4	105	1 7/8	1⅜	1–1½E	0–1	1/16–⅛	8
Studebaker C-President 1934	8-3 1/16x4¼	.010	15B	4¼B	.004H	.006H	A	Ch-7	.025	TC	TC	.020	Au	6½	18.4	105	1 7/8	1⅜	1–1½E	0–1	1/16–⅛	8
Studebaker 1A & 2A-Dict. 1935	6-3¼x4⅛	.010	5B	1½B	.004H	.006H	A	Ch-8	.027	TC	TC	.020	Au	5	16½	105	2 1/16	1⅜	½	1½	1/16–⅛	9½
Studebaker 1B-Commander 1935	8-3 1/16x4¼	.010	15B	4¼B	.004H	.008H	A	Ch-8	.025	TC	TC	.020	Au	5	21½	99	1 7/8	1 1/16	½	1½	1/16–⅛	9½
Studebaker 1C 1935	8-3 1/16x4¼	.010	15B	4¼B	.004H	.006H	A	Ch-8	.025	TC	TC	.020	Au	8	21½	110	1 7/8	1 1/16	½	1½	1/16–⅛	9½
Studebaker 3A-Dictator 1936	6-3¼x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8	.025	2B	VDM	.020	Au	6	14	105	2 1/16	1⅜	1–1½	1–1½	1/16–⅛	9½
Studebaker 4A-Dict. Planar. 1936	6-3¼x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8	.025	2B	VDM	.020	Au	6	14	105	2 3/16	1⅜	¼N–¾P	1–1½	1/16–1/32	9½
Studebaker 2C-President 1936	8-3 1/16x4¼	.020	15B	5½B	.016C	.016C	A	Ch-8	.025	TC	FM	.020	Au	8	17.6	110	1 7/8	1 3/16	¼N–¾P	1–1½	1/16–1/32	9½
Studebaker 5A-Dictator 1937	6-3¼x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8A	.025	2B	VDM	.020	Au	5½	13	105	2 3/16	1⅜	1½	½	1/16–⅛	5½
Studebaker 6A-Dictator Pl. 1937	6-3¼x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8A	.025	2B	VDM	.020	Au	5½	13	105	2 3/16	1⅜	¼N–½P	½	1/16–⅛	5½
Studebaker 3C-President 1937	8-3 1/16x4¼	.020	15B	5½B	.016C	.016C	A	Ch-8A	.025	TC	FM	.020	Au	8	16	110	1 7/8	1 1/16	¼N–½P	½	1/32–1/32	5½
Studebaker 7A & 8A-Com. 1938	8-3⅛x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8A	.025	2B	VDM	.020	Au	5½	14½	105	2 1/16	1⅜	45′	½	1/16–⅛	5½
Studebaker 4C-President 1938	8-3 1/16x4¼	.020	15B	5½B	.016C	.016C	A	Ch-8A	.025	TC	VDM	.020	Au	8	17	105	1 7/8	1 7/8	45′	½	1/16–⅛	5½
Studebaker G-Champion 1939	6-3x3⅞	.020	15B	5B	.016C	.016C	A	Ch-8	.025	1B	FM	.020	Au	5	10½	105	1 1/32	1⅛	5½–6½	½	1/16–1/32	5½
Studebaker 9A-Com. 1939	6-3⅛x4⅜	.020	15B	5½B	.016C	.016C	A	Ch-8	.025	2B	VDM	.020	Re	6	14½	105	2 3/16	1⅜	¼N–½P	½	1/16–⅛	5½
Studebaker 5C-Pres. 1939	8-3 1/16x4¼	.020	15B	5½B	.016C	.016C	A	Ch-8	.025	TC	VDM	.020	Re	8	17	105	1 7/8	1 1/16	¼N–½P	½	1/16–⅛	5½
Terraplane K 1932	6-2½x4¾	.006	11B	3¼B	.006H	.008H	B	AC-K9	.025	TC	TC	.020	Au	6	17	95	1 11/16	1⅜	3E	2	0–1/8	7
Terraplane K & KU 1933	6-2½x4¾	.006	10 2/8B	3¼B	.006H	.008H	B	AC-K9	.025	TC	TC	.020	Au	6½	12	95	1 11/16	1⅜	3E	2	0–1/8	7
Terraplane KT 1933	8-2½x4½	.006	10 2/8B	3¼B	.006H	.008H	B	AC-K9	.025	TC	TC	.020	Au	8	16	95	1 11/16	1⅜	3E	2	0–1/8	7
Terraplane K & KS 1934	6-3x5	.010	10 2/8B	3¼B	.006H	.008H	A	Ch-J7	.022	TC	TC	.020	Au	6	18	93	1 11/16	1⅜	2½–3½	2	0–1/8	7
Terraplane KU 1934	6-3x5	.010	10 2/8B	3¼B	.006H	.008H	A	Ch-J7	.022	TC	TC	.020	Au	6	18	93	1 11/16	1⅜	2½–3½	2	0–1/8	7
Terrap. G-Spec. & GU-DeL. 1935	6-3x5	.010	10 2/8B	3¼B	.006H	.008H	A	Ch-J7	.025	TC	TC	.020	Au	6	18	103	1 11/16	1⅜	3¼–3¾	1–1½	1/16	7
Terrap. 61-DeL. & 62-Cust. 1936	6-3x5	.010	10 2/8B	4B	.006H	.008H	A	Ch-J8	.022	TC	TC	.020	Au	6	13	103	1 11/16	1⅜	3½–4½	1–1½	0–1/8	7
Terrap. 71-DeL. & 72-Super 1937	6-3x5	.008	10 2/8B	4B	.006H	.008H	A	Ch-J8	.025	TC	TC	.020	Au	5	12½	80	1 11/16	1⅜	0–½	1–1½	0–1/8	7
Willys 98D 1932	6-3 1/16x3⅞	.008	7B	2B	.004H	.006H	BA	Ch-C7	.025	TC	TC	.018	A	7	14	82	2	1 1/16	1-2E	2	1/16	7½
Willys 80D 1932	8-3⅛x4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	2B	.018	A	8	19½	82	2 1/16	1 1/16	1-2E	2	1/16	7½
Willys 6-90 1932	6-3¼x3⅞	.008	7B	2¼B	.004H	.006H	A	Ch-8	.025	TC	TC	.018	A	7	13½	82	2	1 1/16	1-2	2	3/32–1/8	7½
Willys 8-88 1932	8-3⅛x4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	2B	.018	A	8	19½	82	2 1/16	1 1/16	1-2	2	1/8	7½
Willys 6-90A 1933	6-3¼x3⅞	.008	7B	2¼B	.004H	.006H	A	Ch-8	.025	TC	TC	.018	A	7	13½	82	2	1 1/16	1-2	2	3/32–1/8	7½
Willys 8-88A 1933	8-3⅛x4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	4¾B	.018	A	8	19½	82	2 1/16	1 1/16	1-2	2	1/8	7½
Willys 77 1933-35	4-3⅛x4⅜	.010	TC	TC	.004H	.006H	A	Ch-7	.025	4B	1B	.018	Au	4	9	83	1 11/16	1 1/16	1-2	2	3/32–1/8	7½
Willys 77, 77A 1936	4-3⅛x4⅜	.010	TC	TC	.004H	.006H	A	Ch-C7	.025	5B	1¼B	.018	Au	4	9	87	1 11/16	1 1/16	1-2	2	3/32–1/8	7½
Willys 37 1937	4-3⅛x4⅜	.010	TC	TC	.004H	.003H	A	Ch-7A	.025	4A	1A	.018	Au	4	11	87	1 11/16	1 1/16	3	2	3/32	7½
Willys 38, 48 1938-39	4-3⅛x4⅜	.010	TC	TC	.004H	.008H	A	Ch-C7	.025	5A	FM	.020	Au	4	11	87	1 11/16	1 1/16	3	2	3/32	7½
Willys-Knight Silver Anniv. 1932	6-3⅜x4¾	SV	TC	TC	SV	SV	B	Ch-C4	.025	16B	5B	.018	A	8	17½	89	2⅛	1½	1-2	2	1/8	7½
Willys-Knight 95-Anniv. 1932	6-2½x4⅜	SV	10B	3B	SV	SV	B	Ch-C1	.027	11B	3½B	.018	A	8	15½	89	2	1 1/16	1-2	2	1/8	7½
Willys-Knight 66E 1933	6-3⅜x4¾	SV	TC	TC	SV	SV	B	Ch-C4	.025	16B	5B	.018	A	8	20	89	2⅛	1½	1-2	2	1/8	7½

ABBREVIATIONS

△—At 350 RPM
†—At 1000 RPM
▼—At 2000 RPM
‡—At 2800RPM
♦—At 3000 RPM
*—Denotes Indices or markings on Flywheel
††—With clearance of .015 the valve is .004 off its seat
§—A75,275 without crankcase baffle plates
A—After TC (Timing)
A—Advanced (Breaker housing)
A—Above (Rods removed from)
A—Auto-Lite Spark Plug Co.
AA—Automatic adjustment (Valves)
AB—Some above and some below
Ac—Air cooled
AC—AC Spark Plug Co.
Au—Automatic spark advance
(b)—{Early Model 40—to Frame No. 2783246–6°; Early Model 50—to Frame No. 2782638–7°; Early Model 60—to Frame No. 2789357–7°; Early Model 90—to Frame No. 2785549–7°
°—Others also
B—Before TC (Timing)
B—Below (Rods removed from)
BA—Below or above (Rods removed from)
C—Remove cylinders (Rods removed from)
C—Cold (Valves)
CA—Champion or AC—optional
Ch—Champion Spark Plug Co.
CSM—Chain Sprocket markings only
D—90-2½B; 98-TC
E—Empty (easter)
F—60—3½ to 4½; 80—4¼ to 5¼; 90—4 to 5
FA—Master only—1¾ to 2¾
FB—Master only—½ to 1½
FC—Master only—⅝ to ⅞
FD—Master only—6½ to 7½
FM—Flywheel markings
G—61—1¼N to 2¼N; 60S—¼N to 1¼N
GG—61—¼N to ¾P; 60S—¼N to ½P
GH—61—5° 6′; 60S—5° 44′
H—Hot (valves)
(k)—{After Engine No. CD-13605—7½ Teeth; With Dist. 622C—9°B or 3¾ Teeth B; With Dist. 644J—TC
(l)—{With Dist. 622H—10°B or 4 Teeth B; With Dist. 644K—TC
L—Loaded
(m)—{Before Engine No. 11216—Intake .007C ,Exhaust.014C; After Engine No .11216—Intake .015C, Exhaust .017C
(n)—Intake .0125, Exhaust .0156 (Tappet Timing Clearance)
N—Negative
P—Positive
(r)—Pistons out top, Rods from below after removing pins
R—Deluxe capacity 21; Standard-22 Qts.
RE—Retard (Breaker Housing)
SV—Sleeve type valves
TC—Top center
VDM—Vibration damper or fan drive pulley marks
5—Loaded at 600 lbs.
9—Loaded at 800 lbs.
10—Loaded at 450 lbs.
11—Loaded at 750 lbs.

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CHICAGO, ILLINOIS
Out West it's PRECISION BEARINGS Inc.
34 WAREHOUSE BRANCHES

Truck Tune-up and Repair Data

TRUCK MAKE AND MODEL	IGNITION					Compression Pressure at Cranking Speed
	Spark Plug Gap (Inches)	Breaker Point Gap (Inches)	Timing 1000ths of Inch Indicates Piston Travel: Spark Occurs (Deg. B or A TC)	Timing 1000ths of Inch Indicates Piston Travel: No. Flywheel Teeth Spark Occurs B or A TC	Timing 1000ths of Inch Indicates Piston Travel: Breaker Housing	
AUTOCAR						
DF, RHT, DT, DFT, 6D, DH, UD, UDF, UDT, UDP, 6RH, 6D, 6DF, 6UD, UDFT	.020	.021	8½B	1 1/16B	.....	98
N, NT, 6N, UN, UNT, 6UN, 4X4DF, 4X4N, FF, NFT, 6NF, UNF, UNFT, 6UNF, S, US, N60C, 4X4NF, T, TT, 6T, UT, UTT, 6UT, N75C, 4X45, C	.020	.020	2B	¼B	.....	95
TF, TFT, 6TF	.020	.020	9B	3½B	.....	80
RM, RMT, DP, D, ITR, 6X2RL, RL, RH, RLD, RHD, UD, IUTR, UDP, 6X2UD 1936-38	.020	.021	8½B	1 1/16B	.....	98
DF, 2TR, 6X2DF, N, DH, UDF, UN, 2UTR, 6X2UN, 4X4DF, 4X4N, 6X4DF, UNF, US, 6X2UNF, 3UTR, 4UTR, NF, 3TR, 4TR, 6X2NF 1937	.020	.020	2B	¼B	.....	95
S, C, 4X4NF, T, UT, 6X2T, 6X2UT, 5TR, 5UTR, 6X4TO, 6X4UTO, 6X4UTD, 6X4TC, 6X4TD 1937	.020	.020	2B	¼B	.....	95
A, B, UA, UB 1938	.020	.020	TC	TC	.....	95
BROCKWAY						
60, 80 1935	.025	.020	TC	TC	Adv	87
65, 75, 90 1935	.025	.020	12B	3B	Adv	88
90, 100 1935	.025	.020	5B	1½B	Adv	95
120, 140, 141 1935	.025	.020	10B	4B	Adv	75
170, 195 1935	.025	.020	15B	5½B	Adv	78
175X, 180S, 220, 240, 260 1935	.025	.020	15B	5½B	Adv	82
250, 290, 640 1935	.025	.020	10B	4½B	Ret	74
125, 150, 160, 180 1935	.025	.020	8½B	3B	Adv	81
78 1936-37	.025	.020	8B	2½B	Adv	95
87, 88, 92, 90X, 94 1936-37	.025	.020	5B	1½B	Adv	95
96, 110, 125X, 130, 145, 150X4, 150X5, 160X, 180X5BT, 165X 1936-37	.025	.020	8½B	3B	Adv	90
170X, 175X, 180X-SBT Spec., 195X, 220X, 240X, 260X 1936, 1937	.025	.020	15B	5½B	Adv	82
112, 128 1938	.025	.020	8½B	3B	.....	90
CHEVROLET						
LQ International, 1½ Ton SW 1929	.025	.022	12B	3½B	Adv	76
LR Universal, 1½ Ton SW 1930	.023	.020	12B	3½B	Adv	76
LT; MA Independence, 1½ Ton; MB Independence, 1½ Ton DW; MC Independence, 1½ Ton SW; MD Independence, 1½ Ton, DW 1931	.024	.018	12B	3½B	Adv	76
NA Confederate, 1½ Ton SW; NB Confederate, 1½ Ton DW; NC Confederate, 1½ Ton SW; ND Confederate, 1½ Ton DW 1932	.024	.018	12B	3½B	Adv	80
OA Eagle, 1½ Ton SW; OB Eagle, 1½ Ton DW; OC Eagle, 1½ Ton SW; OD Eagle, 1½ Ton DW 1933	.032	.018	10B	3B	Au	80
PA Master, 1½ Ton SW; PB Master, 1½ Ton DW; PC Master, 1½ Ton SW; PD Master, 1½ Ton DW 1934	.032	.018	10B	3⅜B	Au	87
QA Master, 1½ Ton SW; QB Master, 1½ Ton DW; QC Master, 1½ Ton SW; QD Master, 1½ Ton DW 1935	.032	.018	5B	2B	Au	91
RA Master, 1½ Ton SW; RB Master, 1½ Ton DW; RC Master, 1½ Ton SW; RD Master, 1½ Ton DW 1936	.032	.018	5B	2B	Au	99
GC Master, ½ Ton SW; GD Master, ¾ Ton SW; GE Master, 1 Ton SW; SA Master, 1½ Ton SW; SB Master, 1½ Ton DW; SC Master, 1½ Ton SW; SD Master, 1½ Ton DW	.040	.018	5B	2B	Au	104
HC, ½ Ton; HD, ¾ Ton; HE, 1 Ton; TA, 1½ Ton SW; TB, 1½ Ton DW; TC, 1½ Ton SW; TD, 1½ Ton DW 1938	.040	.018	5B	1¾B	Au	90
DIAMOND T						
200, 1 Ton SW; 215, 1 Ton SW 1930-31	.025	.020	TC	TC	Ret	.....
211, 227, 243 1935	.027	.020	TC	TC	Ret	96½
220, 311, 312, 351C, 352, 412B 1935	.027	.020	TC	TC	Ret	100
412DR, 512B 1935-37	.027	.020	TC	TC	Ret	100
212A, 212B, 221, 228, 244, 313, 320, 353, 360, 401, 402, 404, 405, 406, 507, 509, 607, 611, 612, 613, 614	.027	.020	TC	TC	Ret	100
80, 301, 304, 307 1936-38	.027	.020	TC	TC	.....	.....

TRUCK MAKE AND MODEL	IGNITION					Compression Pressure at Cranking Speed
	Spark Plug Gap (Inches)	Breaker Point Gap (Inches)	Timing 1000ths of Inch Indicates Piston Travel: Spark Occurs (Deg. B or A TC)	Timing 1000ths of Inch Indicates Piston Travel: No. Flywheel Teeth Spark Occurs B or A TC	Timing 1000ths of Inch Indicates Piston Travel: Breaker Housing	
DODGE						
Merchants Express, ½ Ton (after Serial P-1001); ¾ Ton Truck (4 Cyl.); 1 Ton Truck (4 Cyl.) 1929-30	.028	.020	.050"	PTB	Adv	.....
¾ Ton Truck (6 Cyl.), 1 Ton Truck (6 Cyl.) 1929-30	.028	.020	4B	.....	Adv	.....
F, ½ Ton SW (4 Cyl.) 1930-31	.022	.020	.050"	PTB	Adv	.....
F, ½ Ton SW (6 Cyl.) 1930-31	.022	.020	.009"	PTB	Au	.....
F, Heavy Duty, 1½ Ton DW 1930-31	.022	.020	4B	.....	Adv	.....
F, 2 Ton DW; F, 3 Ton DW 1930-31	.022	.022	.035"	PTB	Adv	.....
UG-30A, B, C, D, E, F, G, H and UG-31 A, B, C, D, E, F, G, H S and DW 1932-33	.022	.020	.050"	PTB	Adv	.....
G-30A, B, C, D, E, F, G, H and G-31A, B, C, D, E, F, G, H 1932-33	.022	.020	.028"	PTB	Adv	.....
G, 2 Ton DW 1932	.025	.020	.028"	PTB	Au	.....
HC, HCL (Std. head) 1933	.025	.020	TC	TC	Au	.....
HC, HCL (HC head) 1933	.025	.020	2A	.....	Au	.....
HC, HCL (late) 1933	.025	.020	4B	.....	Au	.....
G-30, 1½ Ton 1933	.025	.020	.004"	PTB	Au	.....
H-30, H-31, 1½ Ton 1933	.020	.020	.003"	PTB	Au	.....
H-43, H-44 1933	.020	.020	.002"	PTB	Au	.....
K-30, K-31, K-32, K-33, K-34, 1½ Ton DW 1934-35	.025	.020	2A	.....	Au	.....
K-45, K-46, K-47, 2 Ton DW 1934-35	.025	.020	TC	TC	Au	.....
KC Commi. Car (Std. head), ½ Ton SW 1935	.025	.020	9B	.....	Au	.....
KCL (Std. head), before Serial 8,048,701, ½ Ton 1935	.025	.020	2A	.....	Au	.....
KCL, after Serial 8,048,701 1935	.025	.020	3A	.....	Au	.....
KH-30V (Std. head), ¾ Ton; KH-30V (Std. head), 1–1½ Ton 1935	.025	.020	3A	.....	Au	.....
K-32V (Std. head), 1–1½ Ton 1935	.025	.020	2A	.....	Au	.....
K-35V (Std. head), ½ Ton S and DW and K-45V (Std. head), ½ Ton S and DW 1935	.025	.020	TC	TC	Au	.....
LC Commi. Car, ½ Ton SW 1935-36	.025	.020	3A	.....	Au	.....
LE-16, ¾ Ton; LE-17, ¾ Ton; LE-21, 1 Ton; LE-22, 1 Ton; LE-30, 1½ Ton; LE-31, 1½ Ton; LE-32, 1½ Ton	.025	.020	3A	.....	Au	.....
LF-35, 1½ Ton S and DW; LF-36, 1½ Ton S and DW; LF-37, 1½ Ton 1936	.025	.020	2A	.....	Au	.....
LG-40, 1½ Ton S and DW; LG-41, 1½ Ton S and DW; LG-42, 1½ Ton S and DW; LG-43, 1½ Ton S and DW; LH-45, 2 Ton S and DW; LH-46, 2 Ton S and DW; LH-47, 2 Ton S and DW; LH-48, 2 Ton S and DW 1936	.025	.020	TC	TC	Au	.....
K-60V, 3 Ton DW 1936	.025	.020	.003"	PTB	Au	.....
MC, RC, Commercial Car SW 1937-38	.025	.020	TC	TC	Au	.....
RD, MD, ¾ Ton SW 1937-38	.025	.020	TC	TC	Au	.....
RE, ME, 9,500 lbs. gross 1937-38	.025	.020	2B	.....	Au	.....
RF, MF, 11,500 lbs. gross 1937-38	.025	.020	4B	.....	Au	.....
RG,RH,MG,MH, 13,500 lbs. gross 1937-38	.025	.020	6B	2½	Au	.....
RL, RK, RU, RP, ML, MK 1937-38	.025	.020	2B	.....	Au	.....
FEDERAL						
15X, 15, 75, 75H, 18X, 20, 21, 22, 80, 80H	.025	.020	TC	TC	Adv	.....
25, 85, 85H	.025	.020	TC	TC	Adv	86
30, 40, 50, C7, C8, C7W, C8W, C8H	.025	.020	TC	TC	Adv	80
DM, 10, 28, 29, 87H, 89, 40DR, T10B 1936	.025	.020	TC	TC	.....	.....
T10W	.025	.020	TC	TC	.....	.....
X8RDR-X8R	.025	.020	TC	TC	.....	80
9, 11, 11H	.025	.020	TC	TC	.....	.....
FORD						
AA, 1½ Ton 1930-31	.035	.020	TC	TC	Ret	61
BB, 1½ Ton (4 Cyl.) 1932-34	.030	.020	TC	TC	Au	68
BB, 1½ Ton (V8) 1932-34	.025	.013	4B	1¼B	Au	90
51, 1½ Ton 1935-36	.025	.013	4B	1¼B	Au	90
48, ½ Ton (4 Cyl.) 1933-34	.030	.020	TC	TC	Au	68
46, ½ Ton (V8) 1933-34	.025	.013	4B	1¼B	Au	105
50, ½ Ton 1935-36	.025	.013	4B	1¼B	Au	105
67, ½ Ton 1936	.025	.013	4B	1¼B	Au	90
77 (85 HP), ½ Ton 1937	.025	.015	4B	1¼B	Au	100
73 (60 HP), ½ Ton; 75 (60 HP), 1½ Ton 1937	.025	.015	4B	1¼B	Au	110
79 (85 HP), 1½ Ton 1937	.025	.015	4B	1¼B	Au	100
817T, 81T, 81Y, 81C 1938	.025	.015	4B	.....	Au	100
82Y, 82C 1938	.025	.015	4B	.....	Au	105
GENERAL MOTORS TRUCKS						
T-11, SW; T-19A, SW; T-19B, SW 1929-30	.025	.020	Flywhe	el Mark	Au	.....

ABBREVIATIONS

Truck Make, Model and Tonnage
DW—Dual Rear Wheels
SW—Single Rear Wheels
S&DW—Single and Dual Rear Wheels

Ignition Timing
A—After
Adv—Advanced
Au—Full Automatic
B—Before
IGN—Flywheel Mark
Inj—Injector (Diesel)
OPT—Optional

PTB—Piston Travel before TC
Ret—Retarded
TC—Top Center
VD—Vibration Damper

Truck Tune-up and Repair Data

TRUCK MAKE AND MODEL	IGNITION					Compression Pressure at Cranking Speed
	Spark Plug Gap (Inches)	Breaker Point Gap (Inches)	Timing 1000ths of Inch Indicates Piston Travel: Spark Occurs (Deg. B or A TC)	No. Flywheel Teeth Spark Occurs B or A TC	Breaker Housing	
GENERAL MOTORS TRUCKS (Continued)						
T-15A, 1 Ton SW; T-15B, 1 Ton SW; T-19A, 1½ Ton; T-19B, 1½ Ton; T-19C, 1½ Ton 1930	.022	.022	4B	1B	Au	74
T-25A, 2 Ton; T-25B, 2 Ton; T-25C, 2 Ton 1930-31	.024	.020	15B	.....	Adv	66
T-15AA, ¾ Ton SW; T-15A, 1 Ton SW; T-15B, 1½ Ton SW; T-18A, 2 Ton DW; T-18B, 2 Ton DW; T-19A, 2 Ton DW; T-19B, 2 Ton DW; T-19C, 2 Ton DW	.020	.020	4B	1B	Au	74
T-18A, 2 Ton DW; T-18B, 2 Ton DW 1932	.020	.020	4B	1B	Au	78
T-16A, 1½ Ton S and DW; T-16B, 1½ Ton S and DW 1934	.035	.021	TC	TC	Au	93
T-18, 1½ Ton S and DW 1934	.035	.020	10B	3½B	Au	78
T-51W 1934	.035	.020	17B	.....	Ret	.....
T-16A, T-16B, 1½ Ton S and DW 1935	.025	.020	2B	.....	Au	99
T-18A, T-18B, 1½ Ton S and DW 1935	.035	.020	7B	.....	Au	78
T-16A, T-16B, 1½ Ton S and DW 1934	.035	.021	TC	TC	Au	93
T-18, 1½ Ton S and DW 1934	.035	.020	10B	3½B	Au	78
T-51W 1934	.035	.020	17B	.....	Ret	.....
T-16A, T-16B, 1½ Ton S and DW 1935	.025	.020	2B	.....	Au	99
T-18A, T-18B, 1½ Ton S and DW 1935	.035	.020	7B	.....	Au	78
T-23, T-33, T-43 1935	.035	.020	15B	.....	Ret	.....
T-46, T-51, T-51H, T-61 1935	.035	.020	17B	.....	Ret	.....
T-73, T-73H 1935	.035	.020	15B	.....	Ret	.....
T-74, T-74H, T-75, T-75H, T-78, T-78T, T-83, T-84 1935	.035	.020	17B	.....	Ret	.....
T-14, ½ Ton SW; T-16, 1½ Ton S and DW; T-16H Std., 1½ Ton S and DW; T-16H Dual Ratio, 1½ Ton S and DW 1936	.031	.020	2B	4/5B	Au	99
T-18, 1½ Ton S and DW; T-18H, Std. 1½ Ton S and DW; T-18H, Dual Ratio, 1½ Ton S and DW 1936	.026	.020	15B	5B	Au	78
T-23 Std., 2 Ton S and DW; T-23 Dual Ratio, 2 Ton S and DW; T-23H Std., 2 Ton S and DW; T-23H Dual Ratio, 2 Ton S and DW 1936	.025	.020	2B	⅔B	Au	76
T-33, T-33H 1936	.025	.020	15B	.....	.....	.....
T-46, T-73, T-73H, T-61H, T-61, T-74, T-74H, T-75, T-78 1936	.035	.020	.....	.....	.....	.....
T-14A, ½ Ton; T-14B, ½ Ton; T-16A, T-16B, T-16HA, T-16HB, T-16HC 1937	.031	.021	2B	1B	Au	111
T-18A, T-18HA, T-18B, T-18HB, T-18C, T-18HC, T-23A, T-23HA, T-23B, T-23HB, T-23C, T-23HC, T-23D, T-23HD 1937	.035	.020	15B	5B	Au	77
T-33, F-33, T-33H, F-33H, T-46, F-46, T-46-400, F-46-400, T-61, F-61, T-61H, F-61H 1937	.035	.020	15B	.....	Ret	.....
T-14, T-14S, T-15, T-15S 1938	.030	.020	5B	.....	.....	.....
T-16, F-16, T-16H, F-16H 1938	.030	.020	TC	TC	.....	.....
T-18, T-18H, F-18, F-18H, T-23, T-23H, F-23, F-23H, T-33, T-33H, F-33, F-33H, T-46,F-46,T-61,T-61H,F-61,F-61H 1938	.035	.020	15B	.....	.....	.....
INDIANA						
85, 86, 87	.022	.019	TC	TC	Ret	87
14BB45; 95; 95DR; 95SW75; 95SBT151	.022	.019	TC	TC	Ret	114
17; 17DR; 17SW251; 175BT251; 19DR; 17A; 17ADR; 17ASW251; 16 Bus, 84	.022	.019	TC	TC	Ret	92
INTERNATIONAL						
A4, 2 Ton S and DW; A5, A6, 3 Ton S and DW 1930-34	.025	.021	10B	3½B	Au	76
A1, ¾ Ton SW; A2, B2, 1½ Ton S and DW 1931-34	.025	.021	5B	1½B	Au	72
B3, 1½ Ton S and DW; B4, 2 Ton S and DW 1933-34	.023	.021	5B	1½B	Au	93
C1, C5, ½ Ton SW 1934-37	.023	.021	Flywhe	el Mark	Au	95
C10, 1 Ton; C20, CS20, 1½ Ton S and DW 1936-37	.023	.021	Flywhe	el Mark	Au	72
C15, ¾-1 Ton S and DW; C12, ¾ Ton SW; C30, 1½ Ton S and DW; CS30, 1½ Ton S and DW; C35, C36, 1½-2 Ton S and DW; CS35, 1½-2 Ton S and DW; C35B, Bus S and DW; CS35B, Bus DW; C35T, CS35T, 1½-4 Ton DW; C40, 2-3 Ton S and DW; CS40, 2-3 Ton DW; C40F, C40T, 2-5 Ton DW; CS40T, 2-5 Ton DW 1934-37	.023	.021	Flywhe	el Mark	Au	93
C50, CS50, 3-4 Ton; C50F, C50T, 3-4 Ton; CS50T, 3-4 Ton 1934-37	.023	.021	Flywhe	el Mark	Au	76

TRUCK MAKE AND MODEL	IGNITION					Compression Pressure at Cranking Speed
	Spark Plug Gap (Inches)	Breaker Point Gap (Inches)	Timing 1000ths of Inch Indicates Piston Travel: Spark Occurs (Deg. B or A TC)	No. Flywheel Teeth Spark Occurs B or A TC	Breaker Housing	
INTERNATIONAL (Continued)						
C55, C60, C55F, C55T, C60T 1935-37	.023	.021	Flywhe	el Mark	Au	92
C300, 1½ Ton 1936-37	.023	.021	Flywhe	el Mark	Au	.....
D2, ½ Ton; D5, ½ Ton; D15, ¾-1 Ton 1937-38	.025	.021	Flywhe	el Mark	Au	.....
D30, DS30, 1½ Ton; D35, DS35, 1½-2 Ton; D50, 3-4 Ton; D60, DR60, 3½-4½ Ton; DR70 1937-38	.023	.021	VD	Mark	Au	92
D40, 2-3 Ton 1937-38	.023	.021	VD	Mark	Au	99
D300, DS300, 1½-2 Ton 1937-38	.025	.021	Flywhe	el Mark	Au	.....
MACK, JR.						
1M, 10M, 11M 1936-37	.025	.020	10B	3B	Au	85
20M, 21M 1936-37	.025	.020	10B	4B	Au	85
30M, 31M, 90M 1936-37	.025	.020	10B	4B	.....	78
90MS 1936-37	.025	.020	10B	3¾B	.....	78
2M4A 1937	.025	.020	6B	1½B	Au	85
2M6A, 2M6AS 1937	.025	.020	3B	1B	Au	85
MACK						
BG-EC; BF-S.R.; EB-S.R.; BF-DR; EB-DR	.025	.020	7B	2½B	Adv	90
AB Chain, AB-DR	.025	.020	TC	TC	Mg	83
BM-CH; BX Chain; BX-DR; CJ	.025	.020	7B	2¾B	Adv	91
BQ	.020	.020	2B	1B	Adv	84
AK-4; AC-4	.020	.020	TC	TC	Mg	65
AK-6	.020	.020	2B	1B	Adv	84
EM-S.R.; EQ-DR; EH	.025	.020	7B	2½B	Adv	89
MACK SIX WHEELERS						
BX-2WD, BX-4WD; CJ-2WD; CJ-4WD	.025	.020	7B	2¾B	Adv	91
BQ-2WD; BQ-4WD	.020	.020	2B	1B	Adv	84
REO						
FA Std. Speedwagon, 1½ Ton SW; FB-12 Pass. Bus SW; FC Mstr. Speedwagon, 2 Ton SW; FC Mstr. Speedwagon, 2 Ton DW; FD Mstr. Speedwagon, 2 Ton DW; FE Std. Speedwagon, 1½ Ton SW; FF Gen. Utility Speedwagon, 1½ Ton SW; GA Speedwagon, 3 Ton DW; GB Speedwagon, 3 Ton DW; GC Speedwagon, 3 Ton DW; GD Speedwagon, 3 Ton DW 1928	.030	.018	TC	TC	Ret	.....
DA and DC, Speedwagon Tonner, 1 Ton SW 1929	.025	.020	TC	TC	Ret	.....
GA, GB, GC, GD, Speedwagon, 3 Ton DW 1929	.030	.020	1¼"B	.....	Adv	.....
FA Std. Speedwagon, 1½ Ton SW; FB-12 Pass. Bus SW; FC and FD Mstr. Speedwagon, 2 Ton SW and DW; FE Std. Speedwagon, 1½ Ton SW; FF General Utility Speedwagon, 1½ Ton SW 1929-31	.030	.020	1¼"B	.....	Adv	.....
DF Speedwagon Tonner, 1 Ton SW; DFX, 1½ Ton 1930-32	.025	.020	1¼"B	.....	Adv	.....
DFX, 1½ Ton 1932	.025	.020	1¼"B	.....	Adv	.....
1-A, 1-C, 1½ Ton; 1-B to Serial 1510, 1½ Ton; 1-D to Serial 1900, 1½ Ton 1931-33	.025	.020	TC	TC	Ret	.....
1-B after Serial 1510, 1-D after Serial 1900, 1½ Ton 1932-34	.025	.022	.....	2B	Adv	.....
1B4, 1D4, 2B4, 2D4, 2L4, 2H, 2J, 2K, 3H, 3J, 3K, 3M, 4H, 4J, 4K, 4M 1935	.025	.020	10O	4B	Adv	80
2L, 2B, 2D 1933-34	.025	.020	10B	3B	Adv	80
6AP, 1A4, 1C4 1935-36	.025	.020	3B	1B	Adv	85
1A4H; 1C4H; 1B4; 1D4; 2D4M 1936	.025	.020	10B	4B	Adv	85
1B4H; 1D4H; 2D4MH; 2B4; 2D4; 2H5; 2J5; 3H5; 3J5; 3K5; 3HR5; 3JR5; 3KR5 1936	.025	.020	10B	4B	Adv	80
4H5, 4J5, 4K5 1936-37	.025	.020	10B	.....	Adv	70
450, 475 1937	.025	.020	6B	1¼B	Adv	90
650, 675, 1A4-1C4 1937	.025	.020	2B	½B	Adv	90
1A4H-1C4H; 1B4-1D4; 1B4H-1D4H; 2B4-2D4; 2H5-2J5 1937	.025	.020	8B	3½B	Adv	80
3H5-3J5-3K5: 3HR5-3JR5-3KR5 1937	.025	.020	8B	3B	Adv	80
450, 450L, 475, 475L 1938	.025	.020	6B	1¾B	.....	.....
650, 650L, 675, 675L, 1A4, 1C4 1938	.025	.020	2B	1¾B	.....	.....
1A4C, 1C4H, 1B4, 1D4, 1BM7, 2BM7 1938	.025	.020	8B	3¾B	.....	.....
1B4H, 1D4H 1938	.025	.020	6B	3½B	.....	.....

ABBREVIATIONS

Truck Make, Model and Tonnage
DW—Dual Rear Wheels
SW—Single Rear Wheels
S&DW—Single and Dual Rear Wheels

Ignition Timing
A—After
Adv—Advanced
Au—Full Automatic
B—Before
IGN—Flywheel Mark
Inj—Injector (Diesel)
OPT—Optional
PTB—Piston Travel before TC
Ret—Retarded
TC—Top Center
VD—Vibration Damper

Truck Data *(Cont.)*

TRUCK MAKE AND MODEL	IGNITION					Compression Pressure at Cranking Speed
	Spark Plug Gap (Inches)	Breaker Point Gap (Inches)	Timing 1000ths of Inch Indicates Piston Travel: Spark Occurs (Deg. B or A TC)	No. Flywheel Teeth Spark Occurs B or A TC	Breaker Housing	
REO (Continued)						
2B4, 2D4, 2T5, 2H5, 2L4, 2L7M.....1938	.025	.020	8B	3⅛B	.....	.....
2L4H, 2L7MH, 3H5, 3J5, 3K5, 3HR5, 3JR5, 3KR5.....1938	.025	.020	8B	3B	.....	.....
4H5, 4J5, 4K5, 3L6H.....1938	.025	.020	10B	1B	.....	.....
1L5.....1938	.025	.020	2B	1¾B	.....	.....
STERLING						
FB50, FB60, FB70, De Luxe; FC90 FBT130	.025	.017	.....	.....	.....	112
FB-80, FD-90, FD-97, FC-135, HC-140, FC-100	.025	.020	.....	.....	.....	80
FD115, FBT152	.025	.017	.....	.....	.....	96
HC170, HC185, HCS210, HC250, HC200	.025	.020	.....	.....	.....	76
STEWART						
40A.....1938	.025	.025	TC	TC	.....	105
60A.....1938	.025	.025	.....	.....	.....	.....
61A.....1938	.025	.025	.....	.....	.....	97
45A, 45AS, 47A, 50A, 50AS, 49A.....1938	.025	.025	.....	.....	.....	111
51A.....1938	.025	.025	TC	TC	.....	102
58A.....1938	.025	.025	.....	.....	.....	90
38-6, 31X.....1938	.025	.025	.....	.....	.....	80
STUDEBAKER						
S-1, ½ Ton, SW.....1931	.025	.021	Fly wheel Mark		Adv	.....
S-20, S-30, 1½ Ton; S-40, S-50, S-60, 2 Ton.....1931	.025	.021	Fly wheel Mark		Adv	.....
T2, T4, T6, T8	.025	.020	1B	.....	Adv	75
W8	.025	.020	3B	1B	Adv	80
2T2, 2M2, 2TB2.....1936	.025	.021	2B	1B	Adv	.....
2W6, 2M6, 2NB6, 2W7.....1936	.025	.021	TC	TC	Adv	.....
2W8.....1936	.025	.021	3B	.....	Adv	.....
J5, J15, J15M, J15B.....1937	.025	.020	2B	.....	Adv	101
J20, J20M, J20B.....1937	.025	.020	TC	.....	Adv	96
J25, J25M, J25B.....1937	.025	.020	TC	.....	Adv	98
J30, J30M, K30, K30M.....1937-38	.025	.020	TC	.....	Adv	90
K5, K10, K15, K15B, K15M.....1938	.025	.021	¾B	.....	.....	95
K20, K20M, K20MB, K25, K25M, K25MB.....1938	.025	.021	TC	TC	.....	95
TERRAPLANE						
70.....1937	.025	.020	TC	TC	.....	110
WHITE						
54, 54A, 58S, 59, 59A, 64, 640, 641, 642, 643	.020	.017	8A	3A	Ret	78
60, 601C, 601, 602, 61	.020	.017	TC	TC	Ret	.....
65, 65A, 51AS, 58S, 59A, 620, 621, 63, 630, 631, 65K	.020	.017	TC	TC	Ret	81
613 Bus, 61, 611, 612, 612K, 618, 618K	.020	.017	TC	TC	Ret	106
54, 54A, Bus, 640, 640K, 641, 641K, 642, 643, 691	.020	.017	TC	TC	Ret	83
685A Bus	.020	.017	4B	1½B	Ret	.....
65, 65A Bus, 620, 620K, 621, 621K, 630, 630K, 631, 631K	.020	.017	TC	TC	Ret	92
701, 702, 707	.025	.017	5B	1½B	Ret	89
713 Bus, 712, 718	.020	.017	6B	2B	Ret	121
684 Bus, 686	.020	.017	8B	2½B	Ret	116
730, 731	.020	.017	8B	3B	Ret	116
703, 704, 704K, 706 Bus, 709, 705, 805, 809	.020	.017	12B	4B	Ret	105
706M Bus, 704K2, 712SL, 706, 710, 810.....1936-37	.020	.017	12B	4B	Ret	121
720, 720T, 722.....1936	.020	.017	TC	TC	Ret	92
700, 700K.....1937	.020	.017	12B	4B	Ret	116
712NS, 718NS, 706M, 812, 818	.020	.017	12B	4B	Ret	105
WILLYS						
C-101 (to Engine 10001), 1½ Ton...1930-31	.025	.018	TC	TC	Adv	.....
C101 (after Engine 10001), 1½ Ton.1930-31	.025	.018	TC	TC	Adv	.....
38.....1938	.025	.020	5A	1⅛A	.....	87

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Hudson Announces "Pacemaker Six"

New car in price class between Hudson 112 and De Luxe Six

Addition to 112 line announced

Hudson Motor Car Company has just announced a new series of 1939 cars to be known as the Pacemaker Six line. Built on a 118-in. wheelbase and powered with a 96-h.p. engine, the new series fits into a price class between the Hudson 112 and the Hudson DeLuxe Six, and completes for Hudson a continuous price range from the lowest price field through the moderate price field.

The new Pacemaker Six is available in four body types—a 3-passenger Coupe at $793; a Touring Brougham at $823; a Victoria Coupe at $844, and a Touring Sedan at $854. All prices are for Detroit delivery, including Federal taxes, not including local taxes. Prices for the new series are approximately $50 under the prices of the Hudson DeLuxe Six.

All basic 1939 Hudson features are standard in the Pacemakers. The new cars have Hudson's patented Double-Safe hydraulic brakes, Hudson's new Auto-Poise control, radial safety control, dash-locking safety hood, handy shift at the steering wheel, ventilating wings, air horn and built-in carry-all luggage compartment.

Roominess for passengers and luggage is an important comfort feature. Interior dimensions are identical with those of the Hudson DeLuxe Six. This car gives 55-inch front seat comfort and over 20 cubic feet of luggage compartment space.

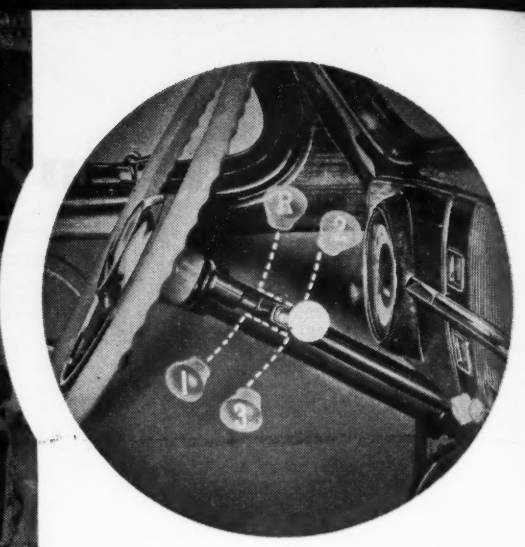
Interior trim and hardware of the new line follow the style trend set by Hudson's 1939 Salon Interiors. The upholstery in the three- and four-passenger coupes is dark brown Chesterfield Cloth. In the Touring Brougham and the Touring Sedan the upholstery is a diamond pattern Boucle. Air-foam seat cushions are optional in the Pacemaker, at small extra cost. Hudson also announces at this time an addition to the Hudson 112 DeLuxe line—a new Traveler Coupe at $695, Detroit delivered price.

A Problem For You

—may be presented the very next time a car drives in your shop. Maybe it will be an oil leak that you just can't seem to stop or a clutch that won't stop "grabbing" no matter what you do. Whatever it is, help in solving the problem is yours for the asking. Simply write to

MOTOR AGE

Reader's Clearing House



Hail the Champion

Studebaker's new entry in the low-priced field has 6 cylinder engine; light body

By ***BOB HANKINSON***

STYLED in the modern manner, Studebaker's new car, the Champion, makes its bow to the motoring public in the low-price field.

Outstanding performance characteristics, economy of operation, and the comfort and safety of its passengers are the features attributed to this new car, and on which it bases its bid for public acceptance. It is offered in three body styles, with Custom and De-luxe models each: a coupe, 2-door sedan and 4-door sedan. Prices start at $660 for the Custom coupe, $700 for the 2-door sedan and $740 for the 4-door sedan, and include standard equipment, delivered at the factory. Deluxe models are $60 higher for each body style. All bodies are on 110-in. wheelbase.

The engine is a six-cylinder, L-head type, 3 x 3⅞ in., 164.3 cu. in. displacement, 6.5 to 1 compression ratio, and develops 78 h.p. Taxable horsepower is 21.6. Main bearings are steel-backed babbitt lined interchangeable type, and rod bearings are spun babbitt. Full pressure oiling system is used to main, connecting rod and camshaft bearings, and to the valve lifters. All oil passages are integral in the block, no detachable pipes being used. Aluminum alloy pistons with Ferrox-treated Perfect Circle rings (2 compression and 1 oil) are used, and valve lifters are fitted with self-locking tappet screws.

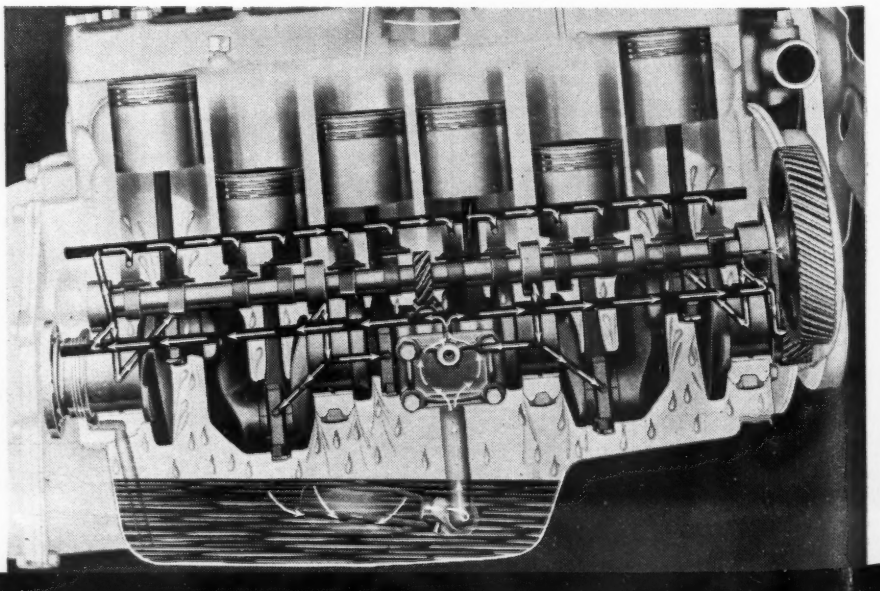
A remote control gear shift lever mounted on the steering column is standard equipment. The transmission is standard, but the overdrive transmission with solenoid control is available as an option.

(*Continued on page 69*)

(Top Left) The flowing lines of the de-luxe four-door cruising sedan were designed by Raymond Loewy.

(Top Right) Radius of the remote control shift, standard equipment on this new car.

(Right) full pressure oil system. The gear driven (from camshaft) helical gear oil pump delivers oil under pressure to the main bearings and through the drilled crankshaft to connecting rods; then through escapement holes to cylinder walls, pistons, piston pins and rings; to camshaft, timing gears, valve tappets and valve mechanism. The oil is directed under pressure through holes drilled in the engine block.



Studebaker

(*Continued from page* 64)

Planar system of front wheel suspension, used on Studebaker cars for the past five years, is standard equipment on the new Champion. Improvements have been incorporated to adapt the system to the design of the new car, particularly to increase its strength. Rubber mountings at the inner ends of the support arms cushion shocks which would otherwise be transmitted to the frame. Houde double-acting hydraulic shock absorbers are used, front and rear. Hydraulic brakes, with mechanical hand brake operating on the rear wheels, provide adequate braking.

Steering linkage is of the same type used on current Studebaker models. Reach rods of equal length connect the left steering knuckle with the steering gear lever, and the right knuckle arm with a symmetrically located frame mounted lever. A central tie rod completes the connection. A Ross, twin-lever steering gear, with needle bearings in the knuckle pins, contributes to ease of handling.

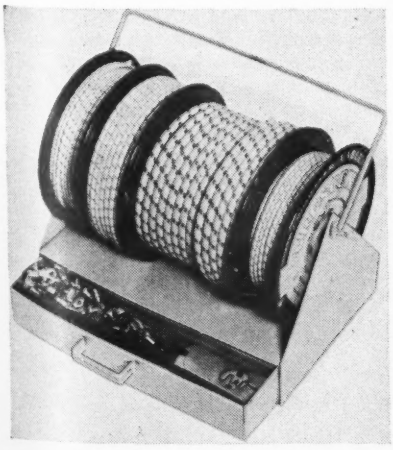
The electrical system incorporates a generator having an output of 28 amperes hot, with voltage regulator control. The starting motor is controlled by a switch mounted on the floor board, and actuated by completely depressing the clutch pedal. Distributor is the automatic advance type, with vacuum spark control. The battery is located under the hood on the left side of the dash.

Bodies are all-steel construction, and doors are equipped with the rotary type of door latch. Door checks automatically hold the doors in wide-open position. There are no running boards. Headlights are recessed in the front fenders.

Provision is made for the installation of the Climatizer system of heating and ventilation, at extra cost.

Wiry Joe Service Kit

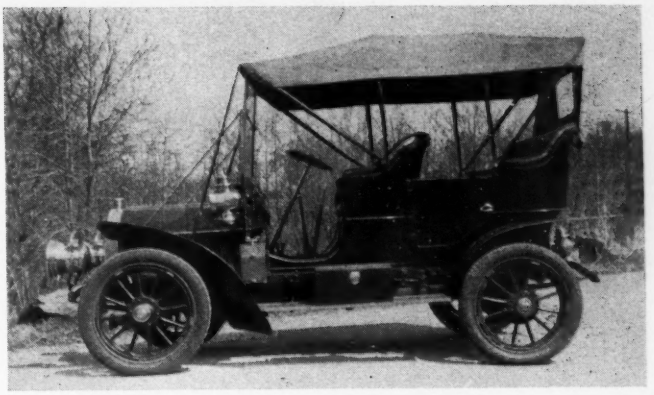
Whatever your needs may be in the line of electric wiring you'll find in the new portable Wiry Joe Service Kit illustrated, made by the Crescent Co., Pawtucket, Rhode Island. It includes



one spool of high tension ignition cable and three spools of primary wire of different gages. Compartments are provided in the all-metal kit for tools and terminals.

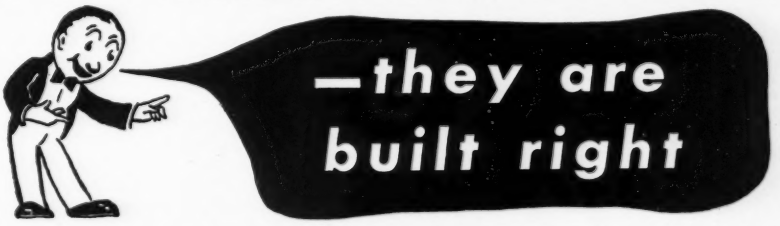
HOBBY

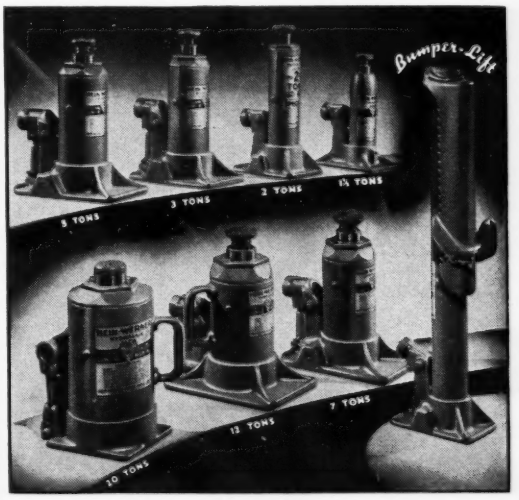
Walter Levino of Peekskill, N. Y., who says he "goes for Motor Age in a big way" sent us this picture of his hobby. It's a 1906 Stevens-Duryea which he "monkeys" with after shop hours. Says he has a lot of fun with it.



It is no wonder that there is such a big demand for

HEIN-WERNER HYDRAULIC JACKS





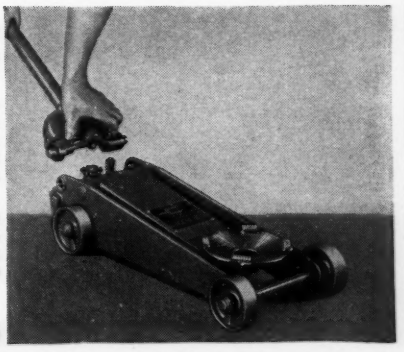
- - and they are priced right . . .

People who buy new cars this spring are "hot" prospects for Hein-Werner Bumper-Lift Hydraulic Jacks. Not a single 1939 model includes one of these handy jacks as standard equipment—so the market is wide open for you. The motorist instantly recognizes the value of this safe, easy operating hydraulic jack which hooks under the bumper arm.

The complete H-W line for passenger cars and trucks includes the "Bullet" 1½ ton capacity jack for passenger cars . . . Also 2 ton "Light Truck Special", 3, 5 and 7 ton capacity jacks for trucks, and 12 and 20 ton jacks for trucks and buses.

LOOK! HERE'S the TALK of the TRADE

New ROAD SERVICE JACK with QUICK REMOVABLE HANDLE



Cast your peepers on the Model "W", shown at right. This new Hein-Werner Hydraulic Jack can easily be carried to the job in any service car. Easy to lift . . . Easy to position . . . Weight of jack only 73 pounds . . . Weight of handle only 11 pounds.

Quick removable handle . . . No bolts or pins to be taken out . . . Slight finger pressure on two levers removes handle . . . Just as easy to put back . . . No tools required . . . Capacity 3,000 pounds.

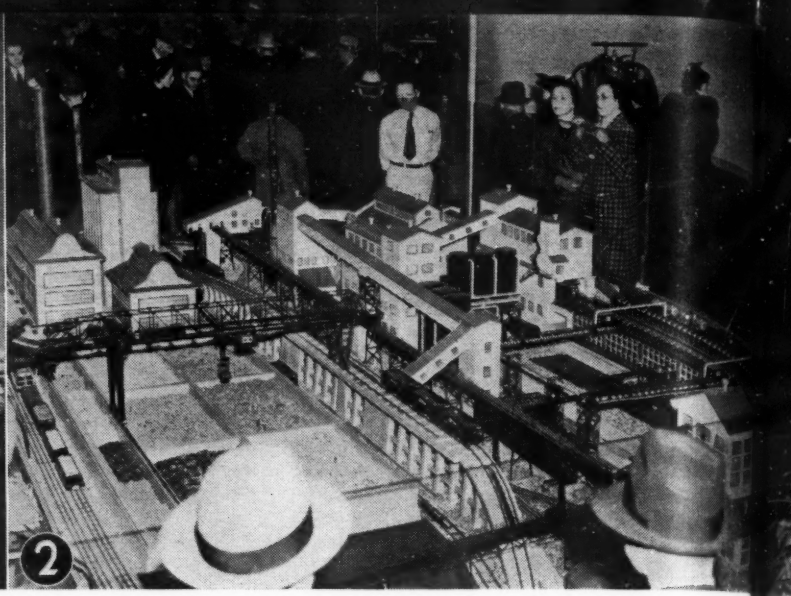
2-3-4 TON FLOOR JACKS

In addition to the Model "W", Hein-Werner also makes a complete line of FLOOR JACKS —2, 3 and 4 ton capacity . . . Ask your H-W jobber, or write us for details.

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER hydraulic JACKS

1



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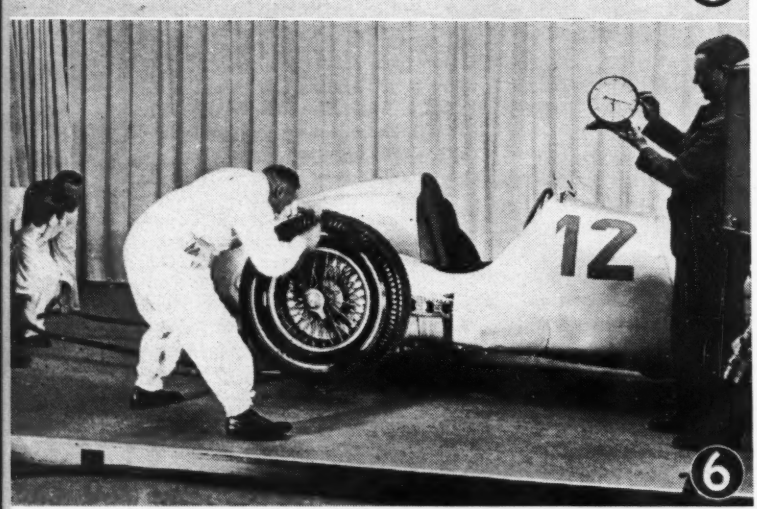

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1. An exterior view of the Ford building at the Golden Gate International Exposition in San Francisco.

2. Within the building is this working model of a Ford plant, showing how raw materials are received and assimilated.

3. A view of General Motors' exhibit at the San Francisco Fair. The huge Diesel engine shown at the right is for use in locomotives.

4. Chrysler's contribution to the same exposition is this attractive exhibit.

5. The start of the auto-tractor race on the ice of Contoocook Lake at Jaffrey, N. H., during the recent winter carnival of the Jaffrey Outing Club.

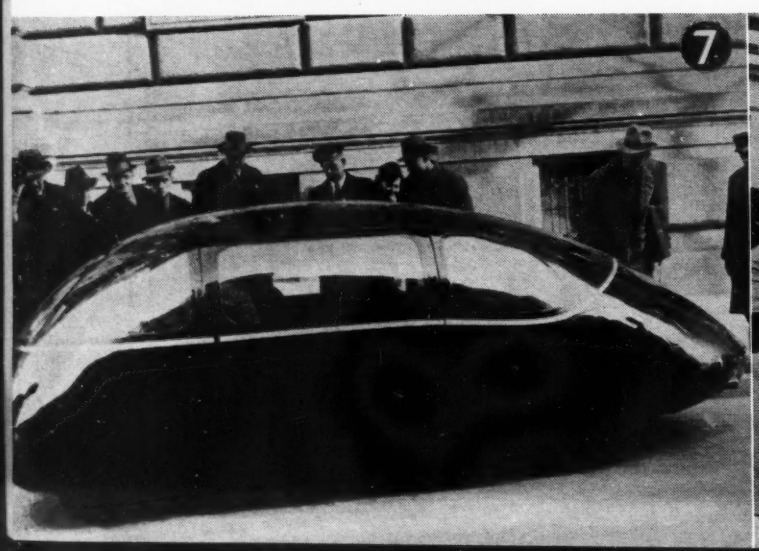
6. A television exhibit as staged at the recent Berlin automobile show. Race driver Rudolf Caracciola was "televised" during a speed contest in changing a tire on a Mercedes-Benz race. His time—19 seconds.

7. A handful of curious onlookers are giving the once-over to a fully streamlined automobile now said to be under production in Berlin, Germany.

8. A visitor at the Berlin auto show examines the eight-cylinder engine of the "Heck." The engine, located in the rear of the car, is constructed in great part of Elektron, a new light alloy.

9. An English motorist, owner of a wood-burning car, applies a taper to the fire-bowl before starting out for a ride. It takes four minutes, it is said, to start such a car at the beginning of a run; thereafter there is no more trouble than with a gasoline driven car. Scrubbers under the running boards clean the gas of tar and moisture.

10. Loading a wood-burning bus in Rome, Italy. This is one of 85 buses of this type in use in Rome. Each bus burns 50 lb. of wood per hour and each holds 300 lb. at a single stoking. Italy reports that these buses, after three years of operation, have proved among the most dependable units in the city transportation system. Small furnaces, concealed in the rear of the bus, carbonize the wood which combines with chemicals to form carbonic acid. Passing in pipes over the burning wood the acid forms carbonic oxide which runs the engine. Rome claims that each bus is operated at a total cost of about 30 cents per day.



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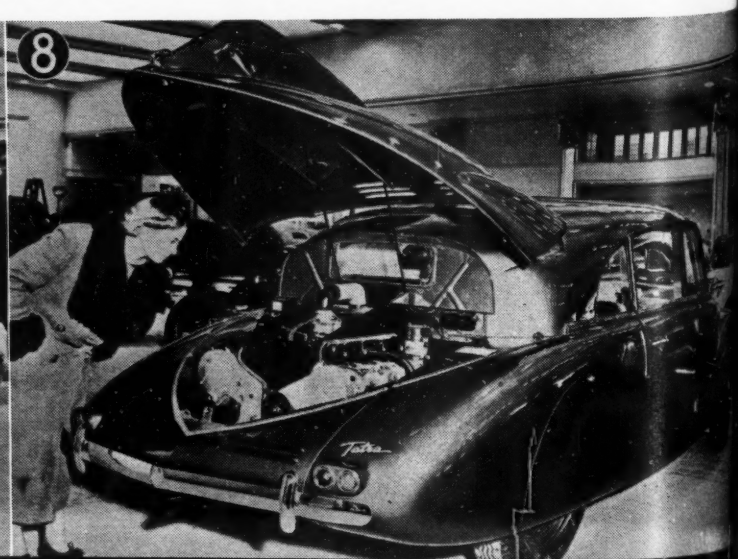

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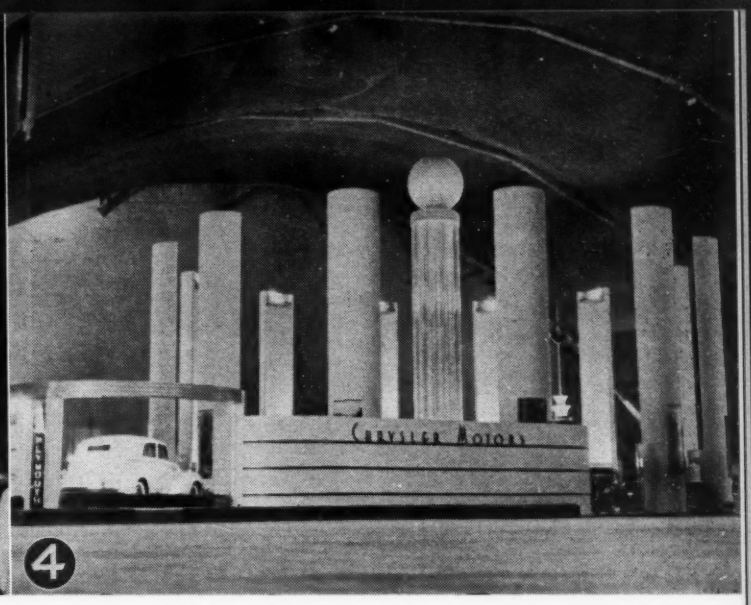

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Three Title Events for A.A.A. Race Season

Indianapolis, Syracuse and Wisconsin State Fair in National Championship Circuit

Addition of the Milwaukee, Wis. State Fair to the National Championship auto racing circuit has increased the card of title events to three for the approaching season.

The pre-season schedule released to MOTOR AGE by the American Automobile Association's Contest Board lists 34 events from the opener at Lebanon, Pa., April 16 to the September 4 races at Altoona (Pa.) Speedway and Akron (N. Y.) Speedway.

Contributing title points with Milwaukee toward the National Championship medals awarded to the nation's three greatest drivers will be the 500-mile International Sweepstakes, May 30, at the historic Indianapolis Speedway and the 100-mile classic Sept. 2, at the New York State Fair at Syracuse. Last year only Indianapolis and Syracuse held points toward the championship title. In 1937 the now closed Roosevelt Raceway on Long Island was the third track offering title points.

Scheduling of the championship race was one of the first moves in the expansion program announced by directors of the Wisconsin State Fair. AAA sanctioned sprint events have been staged there annually in recent years by Hankinson Speedways, whose headquarters are in Philadelphia, Pa., but the fair board decided to promote its own events in 1939. The events will again be supervised by the AAA.

The Milwaukee series of five races, including the title grind, will open on June 4, with a sprint program. Another sprint card will be run there July 4. The first of three races during the annual Wisconsin State Fair will be held at Milwaukee on August 20 when sprints will be run. Another sprint card for the fair patrons is listed for Aug. 24, and the title century on Aug. 27, will end the 1939 card there.

A new half-mile speedway near Harrisburg, Pa., will echo to the roar of speeding motors on May 14. The Williams Grove track will present at least nine sprint races from the May opener until the fall closing. Although Sept. 2 is the final event at Williams Grove on the early-season card, the AAA offices in Washington, D. C., say that other events will be scheduled if weather permits.

The Pensylvania track lists the only night races on the present AAA schedule. The twilight sprints will open July 15.

Pennsylvania's historic Altoona Speedway will offer its first of two races on May 27. The other event will be staged on Labor Day, Sept. 4, the date of some of the nation's greatest classics prior to 1930 when the last of the board speedways stood there. The track has been replaced by a one and one-eighth mile dirt oval along the inside circle of the old board saucer.

Present plans call for the mile Langhorne (Pa.) Speedway, near Philadelphia, to open with a sprint card on May 21. A second event there is tagged for June 11.

(*Continued on page* 84)

John H. Teetor

John H. Teetor, former president and one of the founders of the Perfect Circle Piston Ring Co., died March 9. Mr. Teetor was 78 years old.

Torque Wrench Comment

Hector Rabezzana, chief engineer of the A-C Spark Plug Division of General Motors in commenting on the article "How Tight Is Tight" which appeared in the March issue of MOTOR AGE and which dealt with the subject of torque wrenches stated that it is impossible to set a single standard of torque (for tightening spark plugs) because of the complexity of the combinations.

Too much pressure may do considerable damage either to the spark plug or to the cylinder head. In the article referred to, MOTOR AGE would like to point out that all of the specifications for torque wrenches were secured direct from the car manufacturers.

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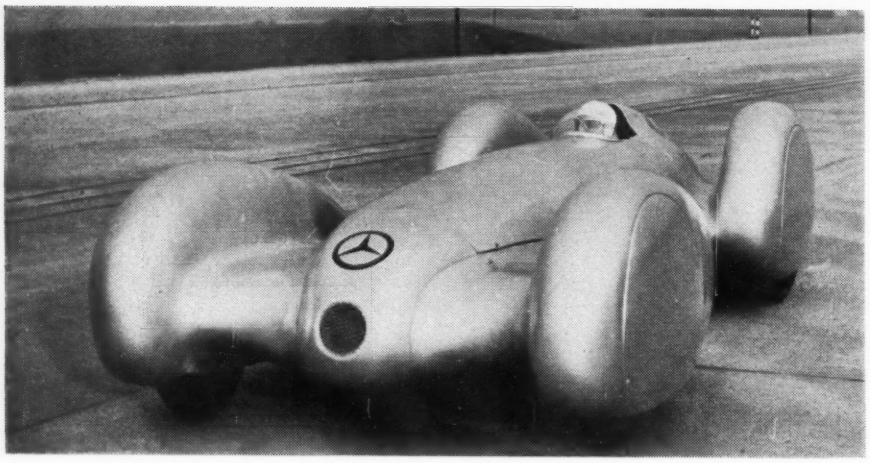


SETS NEW SPEED RECORD

New speed records for racing cars of three liters displacement were established on the Reichsautobahn between Dessau and Bitterfield, Germany, by Rudolf Caracciola in this Mercedes-Benz car. He made the flying kilometer at an average speed (for both directions) of 247.46 m.p.h. and the flying mile at the average speed of 248.286 m.p.h.

New Engine Designed With 30 Moving Parts

A new engine, designed primarily for airplane use but which can be used generally in the commercial field, claimed as revolutionary in type, was demonstrated in Los Angeles this week by Lieutenant S. W. Neighbors before a group of airplane executives and manufacturers. The new engine contains only 30 moving parts, is full rotary in principle and measures 26 in. in diameater by 18 in. overall in length; runs on five ball bearings and eliminates entirely the use of pistons, connecting rods and cylinders.

The engineers claim the engine weighs only 412 lb., develops 500 hp. at 4500 r.p.m., consumes eight gallons of fuel an hour and has attained in tests a speed of 10,000 r.p.m. without vibration.

According to Lieutenant Neighbors, the group which developed the engine is financed privately. A plane unit is under construction which will test out the engine in the air.

A.A.A. Midget Schedule

A schedule of fourteen midget automobile races per week has been announced by the Contest Board of the American Automobile Association for the eastern states this summer.

Also running events on a regular schedule under AAA supervision will be the Gilmore Speedway and the Atlantic Speedway at Los Angeles, Calif.

Increased activity in the AAA midget field has resulted in a uniform scale of points to winners of events which will go toward the Eastern and the Pacific Coast Championships. A National Championship race for the vest-pocket cars will be run next December in Los Angeles.

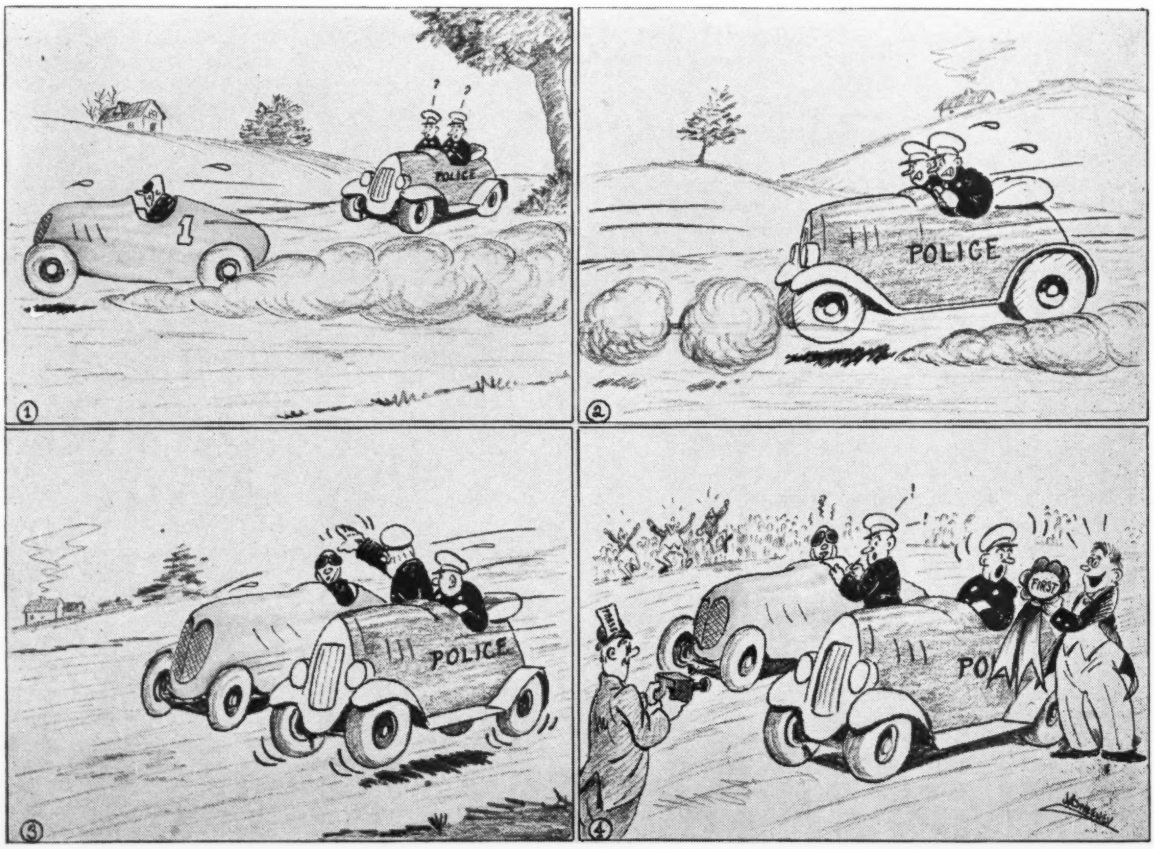
The board midget speedway at Nutley, N. J., has already opened and the schedule calls for races at two tracks each night during the summer. Three "A" headquarters announced that three tracks have asked for sanction for the Saturday night events and that final decision was being reserved.

Ted Allen, Contest Board secretary, said the midget activity under the AAA banner likely would be extended to other sections of the nation. He said expansion of the sponsoring board's personnel was being arranged to maintain the added activity.

The Eastern midget schedule for the summer follows: Sunday—Nutley, N. J., and Coney Island, N. Y.; Monday — Cedarhurst, Long Island, and Bridgeport, Conn.; Tuesday — Philadelphia, Pa., and Bronx, N. Y.; Wednesday—Nutley, N. J., and Coney Island, N. Y.; Thursday—Cedarhurst, Long Island, and West Haven, Conn.; Friday—Philadelphia, Pa., and Bronx, N. Y.

Tire Tractor Corp. Appoints Hendler

Fred Hendler, former Philadelphia branch manager of United Motors Service Corp., has been appointed Eastern sales manager for the Tire Tractor Corp.



YOU are the Subject of Our National Advertising for

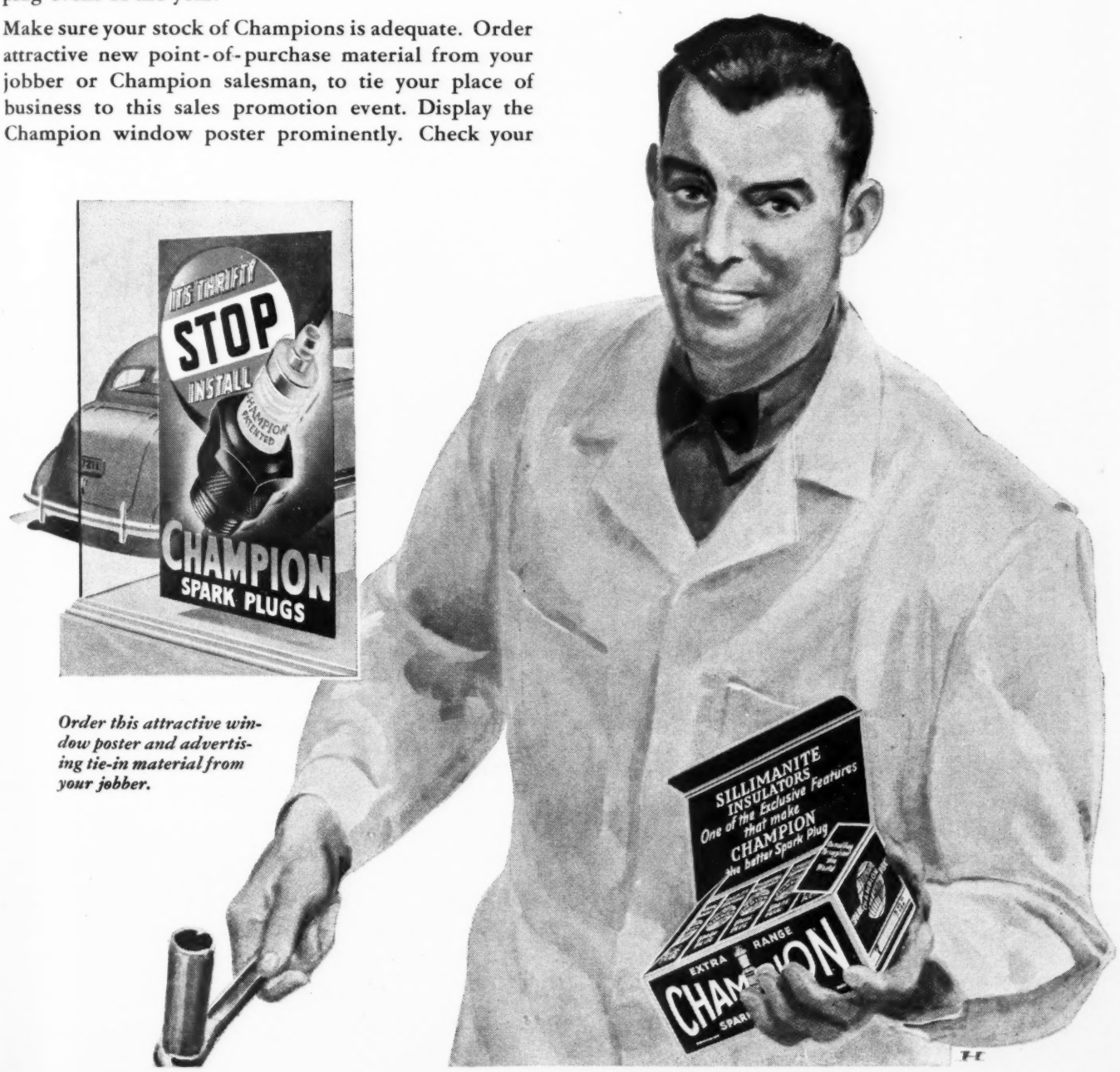
National Spark Plug Change Week

Cash in on the 46,665,881 magazine and newspaper advertisements which are featuring *you*, and your services as a Champion Spark Plug dealer, just before and during the week of May 1st to 7th.

Get your rightful share of these *extra* profits which come every year at this time, from the intensive merchandising and advertising of the outstanding spark plug event of the year.

Make sure your stock of Champions is adequate. Order attractive new point-of-purchase material from your jobber or Champion salesman, to tie your place of business to this sales promotion event. Display the Champion window poster prominently. Check your Champion Service Unit, or get one of these sales producing, cleaning and testing devices if you don't have one.

Champion Spark Plugs, the *preferred* stock investment, will pay you handsome *extra* dividends in May, if you avail yourself of all the merchandising and promotion tools offered you during National Spark Plug Change Week. Talk it over with your jobber salesman NOW!



Order this attractive window poster and advertising tie-in material from your jobber.

U. S. Health Service Sets Rest Room Standards

Recognizing that rest rooms operated in connection with gasoline filling stations and garages are a public convenience whose sanitary condition may have important effects on the public health, the United States Public Health Service has commended the high standards which a number of leading oil companies have adopted in the maintenance of these facilities.

At the same time, for the benefit of others, including the patrons of these rest rooms, the Service outlines what it regards from the health standpoint as primary requirements. These requirements, which are in accord with the practice of the best oil company chains of stations, emphasize that there is no substitute for the fundamental sanitary practice of scrupulous cleanliness:

1. Use split-seat toilets, with surfaces of non-porous material.

2. For cleanliness, depend solely on thorough manual cleansing by means of soap, water and plenty of "elbow grease."

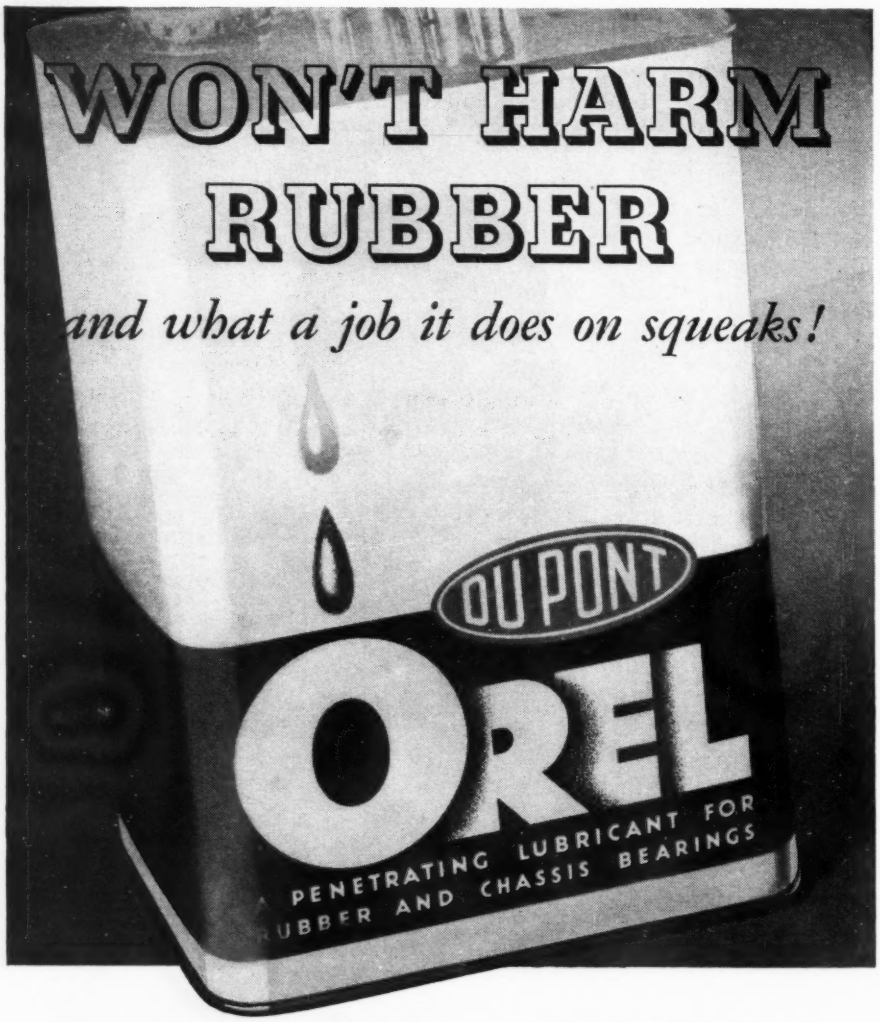
3. Use of deodorant and disinfectants imparts a false sense of security, often substitutes one odor for another, and is considered unnecessary. In the event that there is a spilling of urine around the base of the bowl or urinal, a dilute solution of formaldehyde, in addition to mechanical cleanliness, may be used at times.

4. The temperature of toilet rooms should be lower than that of living rooms, but not cold enough to chill persons using the facilities. Provisions should be made for fool-proof constant ventilation.

5. Hot running water, paper towels and liquid or powdered soap from dispensers should be supplied; a receptacle should be supplied for used towels. Periodic emptying of the used towels should be an important part of the service.

6. Paper drinking cups or a bubbler should be provided *outside* of the room in which the toilet and washing facilities are provided. This enables closer supervision of these facilities and makes the drinking of water more inviting. Provisions should be made for collection and disposal of used paper cups so that an eyesore may not be created by an untidy overflow. If a drinking fountain is provided, there should be frequent supervision and cleansing by a reliable attendant.

7. *No sanitary device or appliance is self-maintaining.* Therefore, the human factor is intimately involved, and unless there is an earnest desire and intent to maintain the appliance at its required efficiency, an unpleasant condition will inevitably arise.



New rubber lubricant, made by Du Pont, penetrates deeper...won't wash out

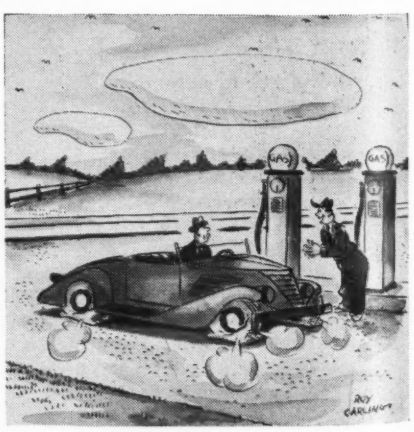
GET RID of "canaries" with "Orel," the new penetrating lubricant that's safe on rubber, death on squeaks! "Orel" penetrates deeper, lasts longer, won't wash out.

Make "Orel" part of your regular lubrication job. It's ideal for bushings in shock absorber arms, spring shackles, sway eliminator bars, motor and body mountings, rubbers between spring leaves, fan belts, or for any other rubber parts as well as metal-to-metal chassis contacts. Easy to apply, either with a brush or an oil can that squirts a thin stream.

"Orel" is made by Du Pont, makers of "Zerone" Anti-Rust Anti-Freeze. Order your supply of "Orel" from your jobber today. Cases of three gallons, $1.85 per gallon. Five-gallon containers, $1.75 per gallon. E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

Spark Plug Torque Wrench

You can't buy it—but you can have it free! The new Blue Crown Spark Plug Torque Wrench is given away in connection with the Blue Crown Profit Sharing Program. The wrench is only 9 in. long, has micromatic precision and easy adjustment. Guards against stripping threads in cylinder heads and improper spark plug installation resulting in compression and power loss. Write Motor Master Products Corp., 4757 Ravenswood Ave., Chicago, Ill., for complete details about their Profit Sharing Program.



"Can I do something for you, sir?"

Exide gives Exide Dealers 100% CO-OPERATION

Exide believes every Exide Dealer has the right to expect 100% co-operation from the maker of Exide Batteries. What does this include?

EXIDE BATTERIES. A complete line of batteries priced for every car-owner—batteries known for their quality and value to every customer who enters your place of business.

NATIONAL ADVERTISING. Consistent, powerful advertising that keeps the facts about Exide before the nation's car-owners, month after month.

EXIDE AUTOMATIC VENDORS. An entirely new idea in selling, which attracts attention, compares batteries on the basis of their cranking ability, life and price, and sells the higher-profit Exide types—automatically.

TESTING INSTRUMENTS. Accurate, easy-to-use instruments that bring out the real facts about a battery's condition and present them to your customers in terms they can understand.

SURE-START SERVICE EQUIPMENT. The revolutionary service procedure originated by Exide, which brings you many more sales of new batteries, builds lasting good-will, and creates many new customers.

IMPROVED SERVICE TOOLS. The handiest, simplest tools you've ever used for servicing batteries, making every job easy.

Exide Dealers themselves have discovered what Exide co-operation means. On this page, you can read what some of them say. See your Exide Wholesaler today, or get in touch with us.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

"My routine in servicing a car always starts with the battery as I have learned that many other failures are reflected there. I have handled Exides since 1923, and in general it is the finest battery proposition on the market, including quality of product, national advertising, availability of stock, completeness of line, and profit producing possibilities."—Mr. Alson H. Ives, Troy, N. Y.

"One of the main reasons we have handled Exide batteries in our Super Service Station for over 10 years is that Exide's public acceptance makes it easy for our men to sell batteries without sacrificing any of our rightful profit."—Mr. Fred C. Lodde, Pres., Lodde Brothers, Inc., Kansas City, Mo.

"Quality in batteries in my service station is gauged by Exide performance. A complete and accurate record of all battery sales convinces us that the best satisfied customer is the one who bought an Exide. A valuable part of the Exide proposition is your rental and recharge plan."—Mr. David W. Shaw, Shaw Service Station, St. Louis, Mo. Mr. Shaw is President of Associated Petroleum Retailers of Greater St. Louis, and Vice President, Division of Legislation, NAPR.

"Realizing the value of good batteries, well advertised, backed up by a real service merchandising plan and a wide awake manufacturer, I took on Exide batteries last June. Increased sales and profits on batteries and related merchandise have proved my thinking to be correct."—Mr. Carl L. Hoffman, Erie, Pa.

"Before the Exide Vendor was available only the men in our battery department were able to sell batteries. The Exide Automatic Vendor has changed all that. Men in every department of our super-service are selling batteries today. The Vendor simplifies the selling for the Dealer and simplifies the buying for the car owner."—Mr. Rene Le Goube, Washburn-Walker Co., Inc., Los Angeles, Cal.

Architect's drawing of new Niehoff building

New Home for Niehoff

C. E. Niehoff & Co., now located at 230 W. Superior Street, Chicago, Ill., have under construction, in the same city, a modern building at 4949 West Lawrence Avenue.

According to Mr. C. E. Niehoff, president of the company, this new structure, will provide over double the floor area now occupied, with an abundance of daylight space. Additional space is reserved on the site for future expansion.

The plans include a modern air-conditioned office, automatic heat and other improved facilities that will enable the company to handle both production and service on its ignition parts, hydraulic brake parts and precision testing equipment to the wholesale trade most efficiently. The building is scheduled for completion early in June.

Auto-Lite Offers New Replacement Battery

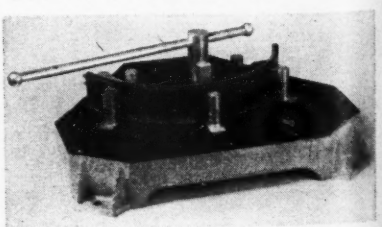
In addition to the present line of moderately priced Auto-Lite Fibre-Glass batteries, USL Battery Corp., Niagara Falls, N. Y., has announced new, lower priced Fibre-Glass types which take care of 90 per cent of all

replacement requirements. These new batteries carry a liberal profit margin and their attractive prices provide additional sales opportunities for Auto-Lite battery dealers.

Fibre-Glass insulation is regarded as a major improvement in battery design in that it prevents plate shedding, a common cause of battery failures.

Brake Shoe Fitter

With this ingenious new machine the brake shoe is always brought back to its original arc, insuring that shoes will accurately fit supports and the entire length of the lining contact the drum. It makes a superior, trouble-free brake job. For details of this Grey-Rock Kam-Way brake shoe straightener, write the United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa.



Edison goes the whole distance

Edison's advanced engineering brings to the automotive industry the *one* line of spark plugs that **goes the whole distance** and gives complete coverage of *every* ignition requirement.

No other line duplicates all the features found in the Edison Spark Plug . . . and no other line offers the type of plug developed for extreme service conditions and high speeds in modern high compression engines. With Edison Spark Plugs for normal service . . . and Edison High Compression Spark Plugs for extreme service, no car . . . passenger or commercial . . . can offer spark plug ignition problems that can't be solved.

In addition to these features, Edison offers a greater profit margin and protection from cut-price competition. The Edison Line . . . and the Edison proposition for independent dealers, will put you *dollars ahead in 1939.*

The Edison
High Compression
HC SPARK PLUG

Only Edison offers these Exclusive Features

- ★ The Built-In Leak-Proof Gasket
- ★ The New Sealed-In Electrode Cap
- ★ The New Albanite Hi-Voltage Insulator
- ★ The Edispark Condenser-Action "Flat" Gap

Edison SPARK PLUGS
EDISON-SPLITDORF CORPORATION
West Orange, New Jersey

ONE OF THE Thomas A. Edison INDUSTRIES

Symbol of Skyway Safety

AMERICAN AIRLINES received recently Aviation Magazine's Maintenance Award. Well merited is this recognition of a system which has developed a rigid routine of daily inspection, reports and records for all operating equipment. When it is realized that this fleet consists of 48 ships, flying 50,000 miles daily, on routes extending from Boston to Los Angeles, the monumental task of maintenance is apparent. In this well organized safety schedule, engine conditioning is of the foremost importance.

And it is here that "dag" colloidal graphite plays its part. During set-up and assembly, this supplementary lubricant is applied to all friction parts where its inherent ability to lubricate, while, at the same time, withstanding high temperatures and heavy pressures, gives added protection against wear. The Acheson Colloids Corporation is happy to contribute to the maintenance of equipment which is building an envious record of safety for its passengers and crews. Send for detailed technical information.

ACHESON COLLOIDS CORPORATION • PORT HURON, MICHIGAN

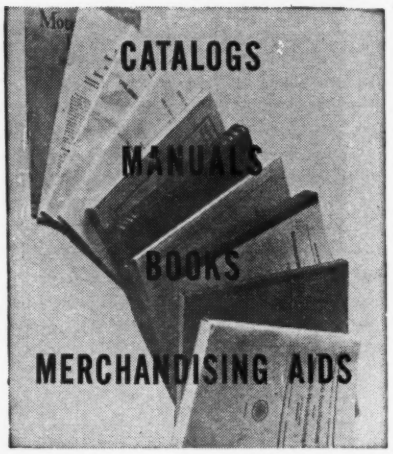
dag
REG. U.S. PAT. OFF.
COLLOIDAL PRODUCTS

COPYRIGHT 1938, ACHESON COLLOIDS CORP.

W. S. Perry Organizes Battery Company

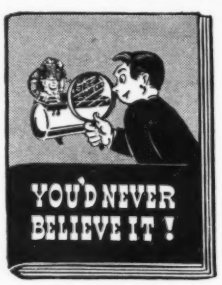
Ward S. Perry, former president of the Vesta Battery Corp., has now organized the Volta Battery Corp., and has as his associates, A. H. Townsend and Michael Sipich. Both these men were formerly with the Vesta Battery Corp., having started with that organization in 1911 and 1912 respectively. Mr. Townsend at one time acted as secretary and sales manager for the old Vesta Co. and is well known in the battery industry especially in the Chicago area. Mr. Sipich, after leaving the Vesta Co., became associated with Amplus Storage Battery Co.

The Volta Battery Corp. will manufacture a complete line of starting and lighting batteries. To quote Mr. Perry, "Volta batteries will be built to the highest standard. Our complete line will service the entire battery industry and because of our knowledge, long experience and reputation in battery building we feel that we can furnish a product and render a service to the battery trade second to none. We expect to be in production not later than March 15 and will start making deliveries at that time on orders that have already started to come in. So far the encouragement and good wishes expressed by our many friends assured us of a most successful business."



In a beautiful new 72-page catalog, the Johnson Bronze Co., New Castle, Pa., tells the story of its complete line of bronze bearings; general purpose bearings machine finished ready for assembly; Johnson universal bronze cored and solid bars; electric motor service bearings, lead-base and tin-base babbitt; bronze graphited bearings and plug type bearings. There are sections on oil grooving, flanged bearings and bushings, an attractive decimal equivalent chart and an explanation of the competent Johnson consulting service.

Write the Wayne Pump Co., Fort Wayne, Ind., for your copy of the new booklet about air compressors. It



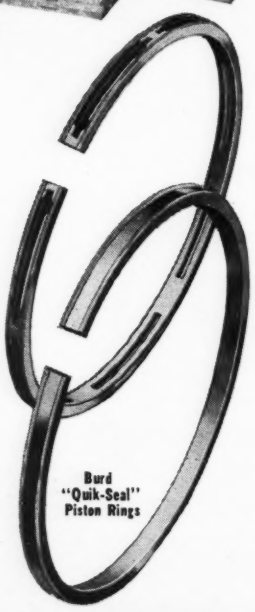
points out the facts about air compressors which are not generally known or appreciated by users.

The Wolverine-Empire Refining Co., of Oil City, Pa., and New York, has now completed the new 1939 Wolf's Head Grease-Rite. If properly used, this book will be of great value. The new book is spiral bound, and is furnished complete with a wire hanger which permits the book to be opened at any desired page and hung upon the automobile to be lubricated, as a reference guide. The book is printed on durable, heavy paper and varnished on both sides in order that it may be readily cleaned.

The book consists of 96 pages—90 of which are devoted to car diagrams; pages 1 and 2 are devoted to instructions of a general nature; page 3 contains a Motor Oil Recommendation Chart; page 4 lists additional sales opportunities that should be checked on every car; pages 5 and 6 are devoted to Tire Inflation Pressures; and the inside front and back covers are devoted to a description of Wolf's Head lubricants and their application.

LINE PRODUCTION Plus

Each of these men . . . and many others . . . has his own hopper of uniformly, blended and conditioned molding sand, brought by overhead conveyor. He has the most modern air-actuated jogging and tamping machines that bring the finished mold to desired density with mathematical accuracy for complete and correct control of cooling rate. Together with chemical control of the metal and pyrometer control of its pouring temperature, it all brings the grain structure and physical properties which form the foundation of Burd's inherent, balanced tension. Thus does mass manufacture combine the speed of the assembly line with the precision of the laboratory to give users of Burd piston rings the utmost in motor performance. Write for 1939 profit proposition.



BURD PISTON RING CO., Rockford, Ill.
(Associate Company Liberty Foundries Co.)

BURD PISTON ★ RINGS

LINDBLOOM VALVE PACKING • HADEES HOT WATER CAR HEATERS

ATLANTA, GA. . . 542-544 Spring St. N.W.
BOSTON, MASS. . . . . 1 Brighton Ave.
CHICAGO, ILL. . . . . 2236 S. Wabash Ave.
DALLAS, TEXAS . . . . , 2705 Can on St.
KANSAS CITY, MO. . . . 1606 McGee St.
LOS ANGELES, CAL. . . . . 1425 S. Flower St.
MINNEAPOLIS, MINN . . . . . 21 S. 13th St
NEW YORK, N. Y. . . . . 549 W. 52nd St.
ST. LOUIS, MO. . . . . 3225 Locust Blvd
SAN FRANCISCO, CAL. . . 540 McAllister St.
SEATTLE, WASH. . . . 1509 Boylston Ave.
MONTREAL, Quebec, Can. . . 732 S. Antoin
TORONTO, 5, Ont. Can. . . . 20 Hayter St.
WINDSOR, ONT., Can. . . 90 E. London St.
WINNIPEG, MAN. CAN. . . 126 Lombard St.

A Glowing Beauty with SPEED and PERFORMANCE *that is amazing*

U. S. Silver Scout Lubricator not only dresses up a station but puts a zip into lubrication sales that adds many new satisfied customers to your station plus many additional dollars to the till. It's no trick at all for them to earn their actual cost in increased lubrication sales within a few weeks.

Mechanically they are the closest thing to perfection yet attained in lubrication equipment.

1. **Ball bearing, hose swivel connections absolutely grease tight.**
2. **Air Tight Rotary Valve actuating air and grease pistons.**
3. **New "leak proof" control nozzle conserves your air supply.**
4. **Holds original 25 lb. container or 65 lbs. of lubricant in the bulk.**
5. **Beautiful Chromium tank bumpers, Chromium pump and top.**
6. **Mounted on four swivel casters, extremely portable and well balanced.**

NET PRICE ONLY

98.00

EACH PRODUCTION UNIT IS "A WORK OF ART"

THE U. S. AIR COMPRESSOR COMPANY

5300 HARVARD AVENUE • CLEVELAND, OHIO

STOPS THE SOUTHERNERS

We mark the Sebastian Garage in Sebastian, Fla., as another Motor Age booster. It's a fine example of making the most of appearance to appeal to the passing motorist. In the shop at this location is every Flat Rate Manual that Chilton has published

C.S.R.A.-A.A.A. Drop Inter-Sanction

The long-hinted breach between the contest boards of the American Automobile Association and the Central States Racing Association was affirmed recently in official announcement that the working agreement between the speedway governing bodies would not be renewed in 1939.

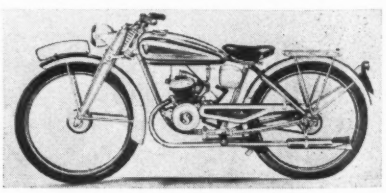
From Ted Allen, secretary of the AAA board, and Norman Wittee, secretary of the CSRA group, came the verification that drivers would be restricted to races sanctioned by their respective groups. Last year AAA drivers and CSRA pilots were permitted to race in events carrying either banner.

Both groups have ordered strict penalties on their drivers who should violate the mandate by competing in events not sanctioned by the association with which they are affiliated.

The working agreement between the AAA and CSRA became effective last August and disagreement between the bodies was said to have taken form in December. Numerous conferences failed to bring about renewal of the agreement which ended December 31.

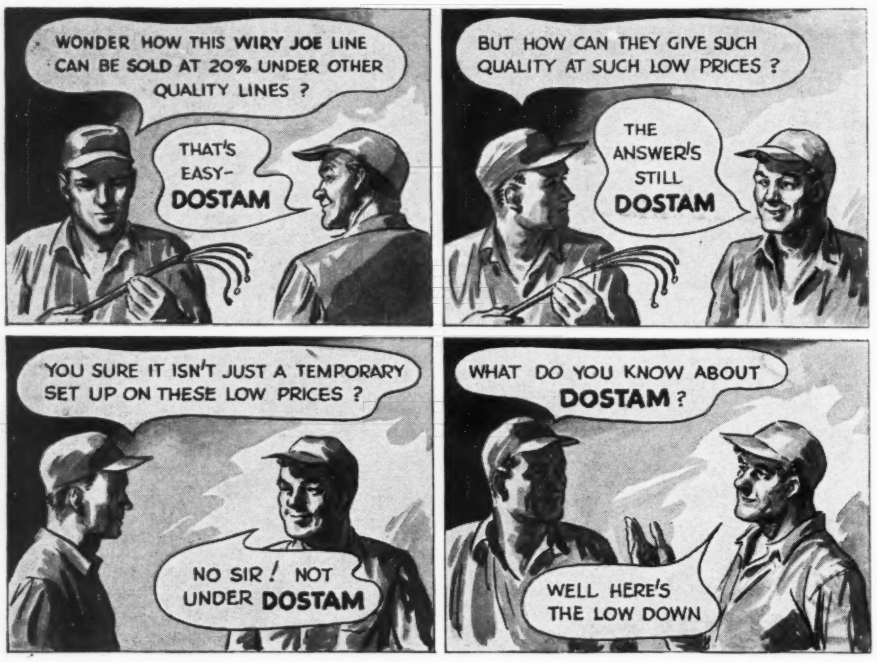
Imported Motorcycle

Said to be capable of delivering 100 miles per gallon and maximum speed of 35 to 40 m.p.h., the new Victoria-Sachs single-cylinder light weight motorcycle, of German manufacture, is being presented in this country by Walter Romberg, 80 West Broadway, New York City. Its engine is a single cylinder 2-cycle job of 6 cu. in. displacement. Crankshaft and connecting rod bearings are roller bearings; clutch is hand-operated; the transmission has two forward speeds; frame is light weight steel tubing (complete motorcycle weight, 125 lbs.); 2-gallon gas tank; internal expanding brakes on front and rear wheels. For complete information and prices, write the U. S. representative, Walter Romberg.



Baron Forms Own Firm

William P. Baron, well known in the automotive trade for his 25 years of experience as field representative and sales manager for various houses, announces that he has gone into business for himself under the firm name of Baron's Automotive Supplies and Equipment. The firm has established offices at 711 N. Broad St., Philadelphia.


WONDER HOW THIS WIRY JOE LINE CAN BE SOLD AT 20% UNDER OTHER QUALITY LINES ?
THAT'S EASY- DOSTAM
BUT HOW CAN THEY GIVE SUCH QUALITY AT SUCH LOW PRICES ?
THE ANSWER'S STILL DOSTAM
YOU SURE IT ISN'T JUST A TEMPORARY SET UP ON THESE LOW PRICES ?
NO SIR ! NOT UNDER DOSTAM
WHAT DO YOU KNOW ABOUT DOSTAM ?
WELL HERE'S THE LOW DOWN

The DOSTAM METHOD is a new system of business management

It permits production and distribution economies which make it possible for the Crescent Company to offer the highest quality line of automotive wiring at prices which consistently average 20 per cent under the prices of other well-known products.

The Dostam Method is built on the principle of *higher* wages paid to direct labor . . . and decidedly *lower* operating costs effected through the elimination of top-heavy management costs . . . rigid control of selling costs and the complete control of all manufacturing operations from raw materials to finished products.

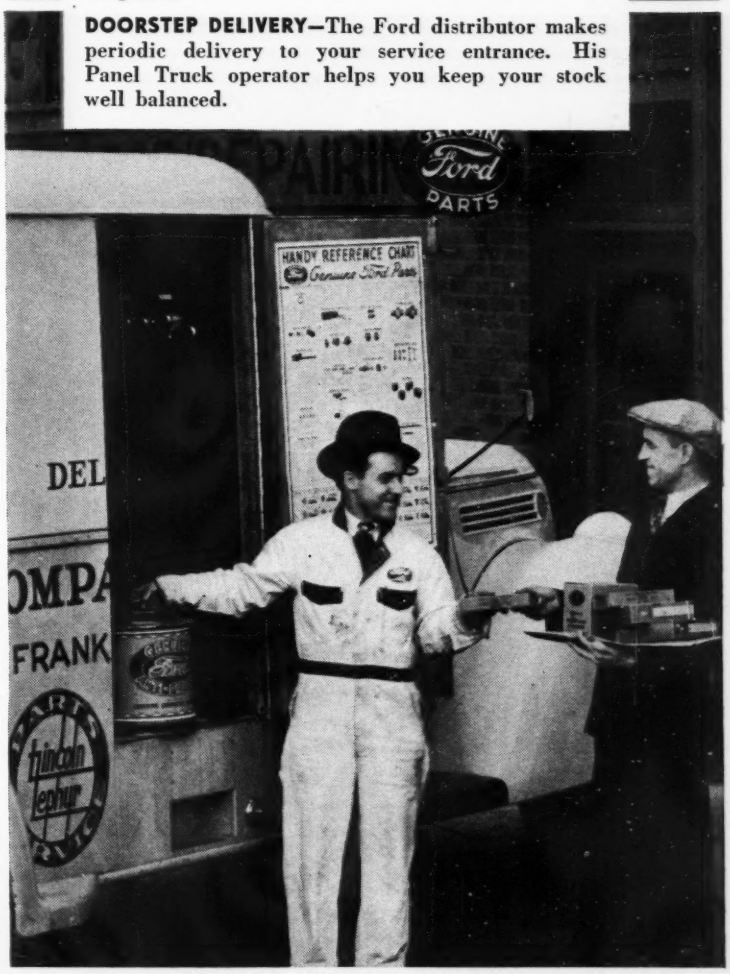
As the largest independent manufacturer of automotive wiring for the replacement field, the Crescent Company in the Wiry Joe Line offers high quality . . . completeness of line . . . and consistently lower prices. For your greater profit make the Wiry Joe Line your line.

This advertisement is appearing in all leading trade publications this month.

Wiry Joe AUTOMOTIVE WIRING
is produced under the
DOSTAM METHOD
THE CRESCENT COMPANY Auto Cable
Pawtucket, Rhode Island, U. S. A.
Montreal, Canada

ACROSS THE COUNTER—Ford Parts distributors maintain thoroughly stocked parts departments where you can get quick service, personally or over the telephone.

DOORSTEP DELIVERY—The Ford distributor makes periodic delivery to your service entrance. His Panel Truck operator helps you keep your stock well balanced.



SERVICEMEN LIKE SERVICE TOO

When you want a part, you want it to be dependable. And usually you want it fast. Ford Service for Servicemen gives you what you want when you want it.

No matter where you are, there is a Genuine Ford Parts distributor near you. His stock is complete; and he is set up for quick service. You can always get Genuine Ford Parts in a hurry, either by going personally to the distributor's counter, or by ordering over the phone. He will deliver promptly.

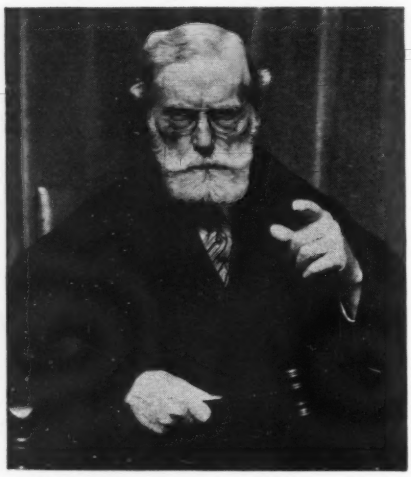
A Ford distributor also has his Panel Truck visit you periodically and helps keep your stock in efficient condition.

It pays to use only Genuine Ford Parts because they meet quality specifications set by the factory for original parts. They are built with precision — tested with severity. You know they'll fit accurately, perform well. This helps build a steady patronage of satisfied customers.

Ask the nearest Ford distributor how to get a Genuine Ford Parts sign to hang outside your service entrance. It tells the Ford owner (and he is one out of every four motorists) that your service is the kind he is looking for.

GENUINE FORD PARTS

Legally Speaking



By

C. R. ROSENBERG, Jr.

Each month MOTOR AGE presents on this page a lawyer's interpretation of Federal and local court decisions of interest to repairmen. A knowledge of how the law regards these various situations may help you keep your shop from being on the wrong end of a lawsuit some day.

Unwise Deal

A repairman who is high-pressured into an unwise contract is not likely to get much help from the law unless he can prove that there was an outright fraud in the transaction, and, as a rule, that is rather difficult to do.

"It has never been the policy of the law," remarks the California Court of Appeals, "to inquire into the wisdom of a bargain when the parties are dealing at arm's length and in the absence of fraud."

"Dealing at arm's length," in the law means dealing in an ordinary business transaction and not in any trust or confidential relationship.

What Did Debtor Pay?

When a customer who owes a repairman several debts, tenders a payment without saying which debt he is paying, how should the payment be applied?

That the manner in which the payment is applied may under some circumstances have a serious effect on the creditor's rights, is shown in a recent Federal Court case. There a debtor owed a creditor both on an open account and on a chattel mortgage which he had executed in favor of the same creditor. The debtor made several payments without specifying to what obligation they should be ap-

plied. Subsequently the debtor went into bankruptcy.

In the bankruptcy proceedings the creditor attempted to enforce his chattel mortgage by claiming for himself the proceeds of the sale of the items on which he held the mortgage. It was objected that the debtor's payments before the bankruptcy had cleared the chattel mortgage and hence that the creditor's only claim was as a general creditor for the payment of the open account. This would have deprived the creditor of the right to the proceeds of the sale of the goods subject to his chattel mortgage.

The Federal Court ruled in favor of the creditor, saying:

"The contention regarding the payment of the chattel mortgage relies upon the rule that if a debtor does not specify how his payment is to be applied, the creditor may apply it as he pleases, and, if neither party makes any specific application the presumption is that the oldest debt is to be first paid. Both parties here considered the payments to have been applied to the unsecured items of the running account, not to the extinguishment of the mortgage debt."

Where a debtor makes a payment without specifying how it is to be applied, a wise creditor will apply it to items which he might have difficulty in collecting. If there is no such choice among several items owing, the law contemplates that the payments will be applied to the oldest items, for they would be the ones first outlawed by the statute of limitations.

"Publication" of Libel

That a business man, almost without knowing it, may become involved in the "publication" of a libelous statement is shown in a case recently before the Federal Courts.

A business corporation received a letter making certain libelous statements about one of its employees in another city. The corporation sent this letter to its local manager in the city where the employee in question was located.

In a suit ultimately brought by the employee against the corporation for libel and slander, it was charged that the corporation "exhibited and published said letter to other employees and to members of the public who read and inspected same" and that the corporation "in uttering and publishing such libelous letter intended to and did charge the aggrieved employee with a crime."

The exhibiting of a libelous writing to even one person is considered a "publication" in the law. As the Federal Court put it in this case:

"Each separate publication being a separate cause of action, the publications by the employees in the local city who received the letter, present as many different causes of action as there were publications."

In other words, every time the letter was exhibited to someone, the person libelled in the letter had a new ground for lawsuit. The local manager allegedly showed the letter to a number of people.

The Court further pointed out that before an employer may be held liable for the acts of an employee in publishing a slander or libel, the employee must have been at the time acting within the actual scope of his employment. Where an employee exhibited a libelous letter or writing during the course of his employment, however, it is likely that the employer would be held liable for such "publication" of the letter.

When an employer allows such a writing to get into the hands of an indiscreet employee he is almost asking for a lawsuit.

Attractive Nuisance

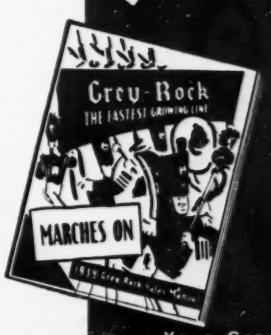
An independent repairman who has on his premises some dangerous item that naturally attracts children, will be held legally and financially responsible for any injury suffered by

(*Continued on page* 108)

35,000,000 SALES CALLS DURING APRIL

"LOOK FOR THIS SIGN OF FIRST CLASS SERVICE STATIONS" say all of Grey-Rock's April consumer ads in *Sat. Eve. Post*, *Collier's*, *Life* and *Time* making 35,000,000 Grey-Rock sales calls for you in April alone.

Prepare for the business they'll bring. See the condensed line of Grey-Rock Balanced Braksets, the complete instruction chart, the huge dealer advertising and merchandising program . . . GROW WITH GREY-ROCK.



Your Grey-Rock jobber salesman has full details in this book.

Grey-Rock BALANCED BRAKSETS

UNITED STATES ASBESTOS DIVISION *of Raybestos-Manhattan, Inc.*, MANHEIM, PA.

BRAKE LININGS • CLUTCH FACINGS • FAN BELTS • HOSE • PACKINGS • RELINING EQUIPMENT

AAA Race Season

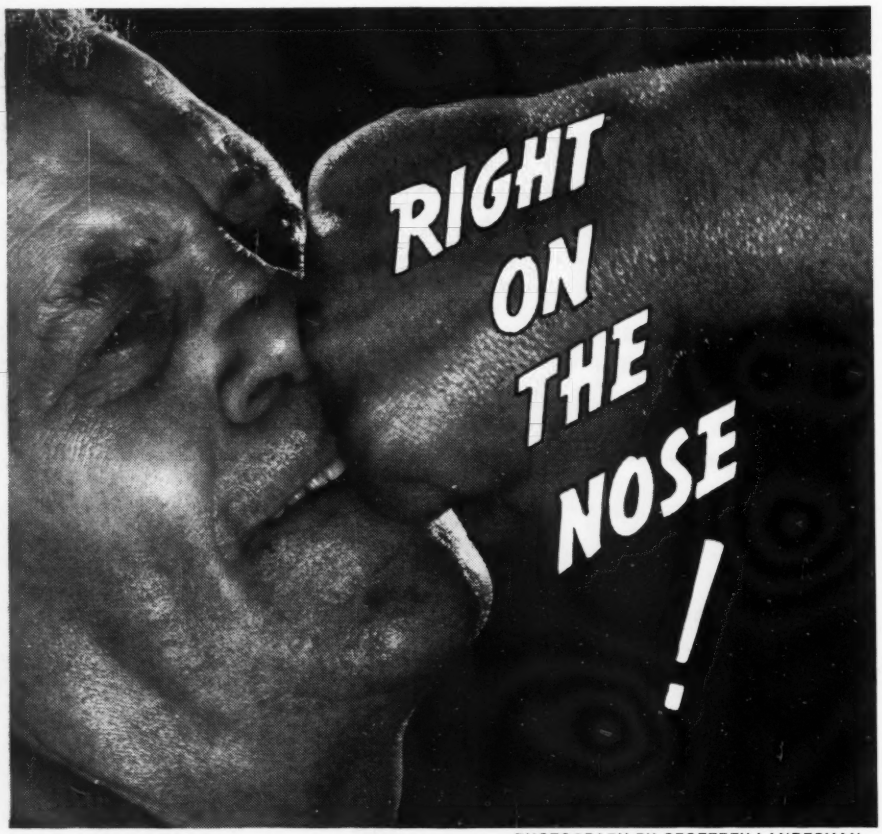
(*Continued from page* 71)

Ted Allen, secretary of the AAA Contest Board, said at national headquarters in Washington, D. C., that his schedule likely would hold several additions for the early-season months prior to the opening. He did not anticipate, however, that the speed kings would go into action earlier than the April 16 sprints at Lebanon, Pa.

The schedule at present follows:

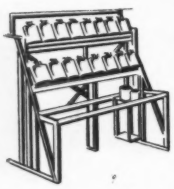
April 16	Lebanon, Pa.
April 23	Pottsville (Pa.) Fairgrounds
April 30	Lebanon, Pa.
April 30	Caledonia (N. Y.) Fairgrounds
May 7	Reading (Pa.) Fairgrounds
May 14	Williams Grove (Pa.) Speedway
May 21	Langhorne (Pa.) Speedway
May 27	Altoona (Pa.) Speedway
May 28	Lebanon, Pa.
May 28	Caledonia (N. Y.) Fairgrounds
May 30	**500-Mile International Sweepstakes, Indianapolis
May 30	Akron (N. Y.) Speedway
May 30	Altamont (N. Y.) Fairgrounds
June 4	Milwaukee (Wis.) Fairgrounds
June 4	Wiliams Grove (Pa.) Speedway
June 11	Langhorne (Pa.) Speedway
June 18	Williams Grove (Pa.) Speedway
June 25	Lebanon, Pa.
July 4	Milwaukee (Wis.) Fairgrounds
July 4	Akron (N. Y.) Speedway
July 4	Williams Grove (Pa.) Speedway
July 15	*Williams Grove (Pa.) Speedway
July 23	Lebanon, Pa.
July 29	*Williams Grove (Pa.) Speedway
Aug. 12	*Williams Grove (Pa.) Speedway
Aug. 20	Lebanon, Pa.
Aug. 20	Wisconsin State Fair, Milwaukee
Aug. 24	Wisconsin State Fair, Milwaukee
Aug. 26	*Williams Grove (Pa.) Speedway
Aug. 27	**100 mile race, Wisconsin State Fair, Milwaukee
Sept. 2	**100 mile race, New York State Fair, Syracuse
Sept. 2	*Williams Grove (Pa.) Speedway
Sept. 4	Altoona (Pa.) Speedway
Sept. 4	Akron (N. Y.) Speedway

* Night race.
** National Championship classic; all others are sprint type races.



PHOTOGRAPH BY GEOFFREY LANDESMAN

You Get a Perfect Match Every Time with the
Arco Color Machine



ANY COLOR FOR ANY CAR

Delivers any needed color from an inventory of only 16 1-gallon cans mounted on this convenient rack.

5 MINUTE COLOR SERVICE

No waiting . . . no delays. Operates simply and quickly. 1500 machines are doing it—every day.

PRECISION MATCH

The fool-proof 3-alarm gauge assures a perfect match every time. Note exclusive clean-pour spout.

ALWAYS A CLEAN SHOP

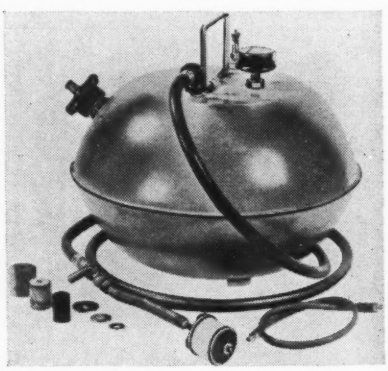
Mechanical agitation eliminates sloppy stirring. And the machine ends messy hand-shading forever!

THE ARCO COMPANY
CLEVELAND, OHIO — LOS ANGELES, CAL.
SPECIFY ARCO PRECISION COLORS

Hydraulic Brake Filler Tank

You don't need help when you bleed brakes if you use the new Bendix "One-Man" Hydraulic Fill Tank recently introduced by the Bendix Products Division of Bendix Aviation Corp., 401 Bendix Drive, South Bend, Ind. With this handy Fill Tank, bleeding and filling service becomes a one-man job.

Made of heavy gage steel, the Fill



Tank weighs 9 lbs. empty, and has a capacity of two gallons of fluid. An automatic float-controlled valve shuts off and seals the outlet before the brake fluid is exhausted, and prevents entry of air into the system. It is supplied with a pressure gage and a quick acting adapter for use with all master brake cylinders. List price $12.50.

Drain Plug Wrench

Ordinarily it's a tough job to reach the crankcase drain plug on the 1939 Ford and Mercury cars, but the job is made easy with the new No. 2373

Herbrand crankcase drain plug wrench. This handy tool is designed with an 11-in. handle having a special bend to clear obstructions, and a hexagonal opening which perfectly fits the plug. List price, $1.90.

CSRA Midget Circuit

A circuit of five midget race tracks has been announced by the Central States Racing Association. The dates for weekly events throughout the summer have not been compiled.

The tracks on the circuit announced by the CSRA are at New Kensington, Pa., Pittsburgh, Pa., Erie, Pa., Buffalo, N. Y., and Cleveland, Ohio.

The association's plans also call for midget events on the big car tracks at Dayton, Ohio, Rockville, Ind., Winchester, Ind., Fort Wayne, Ind., Greenville, Ohio, and Sharon, Pa.

This summer will mark the first year for CSRA supervision of midget races.

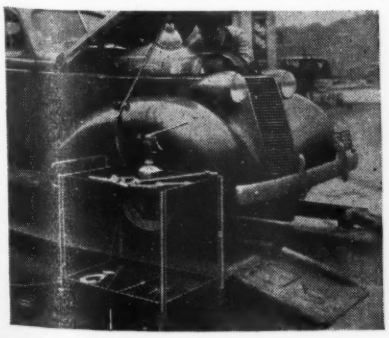
Van Dorn Has New Valve Seat Grinder

Speed up your valve jobs with the new heavy-duty Vibro-Centric valve seat grinder announced by The Van Dorn Electric Tool Co., Towson, Md. This new unit is faster, more powerful than the standard unit, and has a greater capacity and wider range, adapting it especially to truck, tractor

and diesel work. In addition to the new heavy-duty seat grinder, the company has developed a new ball bearing stone sleeve to minimize wear in the sleeve and pilot and to give longer service under constant use. There is a new stone dressing stand, adjustable for larger stones and for angles from zero to 90 deg.

Light Where You Want It

Bringing light to the job without having the drop cord in the way is possible with the new "Handy Helper" illustrated, made by the Revere Electric Co., 757 W. Jackson Blvd., Chicago, Ill. Mounted on a steel cart containing two trays for tools, the light is attached to an adjustable arm which can be placed in any position. Takes a 60 watt lamp. The cart is mounted on casters, and is equipped with a foot brake to hold it at rest. Complete with 25 ft. of rubber insulated cord and plug.



New Metal Reviver Polishes and Cleans

A new chemical suitable for motor cars and boats as well as household use has been announced by the Nu-Met Chemical Corp., of 1452 Broadway, New York. This metal reviver has the unique feature of cleaning, polishing and preserving. It is suitable for use on all metal trim and is especially efficient for chrome finishes such as are used on automobiles.

Nu-Met Reviver is put up in attractive copper finished pint and gallon cans, and also in 55-gallon drums. It carries a broad guarantee stating that if the product does not meet with entire satisfaction, it may be returned to the dealer for full credit.

An interesting counter display, lithographed in four colors and bearing a sample can, is also available. For further information and prices, consult your jobber or the manufacturer.

Cash in Big on This Profit Logic!

"GUARANTEED" Ignition Parts ENGINEERED to compensate for wear

IT'S certainly taken hold! The idea is right—the line is right—the forceful selling campaign behind it is right! Car owners see it. They like the logic. They want the greater efficiency of ignition parts built especially to compensate for wear! • And now the time is right for you to tie-in and cash in BIG. Put this GUARANTEED Merchandiser CA-100 on the job! Provides a full range stock of the fast-movers, and ample space to add more. Attractive steel cabinet and free sales kit are powerful advertisements for the new "engineered" idea—*a profit-maker for you!* A simple time payment plan makes it so easy to own! Write us for details today.

GUARANTEED PARTS CO., Inc. 250 W. 54 St., N. Y. C.

ORIGINATORS OF THE WELL-KNOWN "FOUR-STAR" LINE

War Scares Halt Speed Plans of British Drivers

With the European war scare again having altered plans for the annual "Carnival of Speed" at Bonneville Saltbed in northwestern Utah, Ab Jenkins, America's No. 1 record holder loomed as the only possible candidate for super-speed laurels there in 1939.

Captain George E. T. Eyston, current king of the speed realm because of the 357.5 miles per hour he attained there with "Thunderbolt" last year, advised Gus Backman, secretary of the Salt Lake Chamber of Commerce on March 21 that he would be unable to leave London for his schedule speed assault. Eyston, a retired British army officer, advised that his attention to business in line with England's war preparations would not permit his attention to changes he plans on "Thunderbolt" before returning to attempt to boost his own mark. Work on the huge racer was halted abruptly when Eyston directed his attention to service for his country.

Although John Cobb, fellow countryman of Eyston, had not cancelled his plans for his attempt between August 15 and September 15 as MOTOR AGE went to press, predictions were that Cobb also would be unable to come to the United States. Sudden change in the strained circumstances among European nations likely would permit Cobb to take another crack at the record, it was believed. In the meantime, Backman said the Bonneville Saltbed's governing board was reserving Cobb's dates.

Because of the enormous expense of putting his "Mormon Meteor" in shape for an attempt at the mile record, speed experts were resigned to the prospect that Ab Jenkins would confine his 1939 activity to an assault on the long distance records up to forty-eight hours. Although funds have been pledged by Jenkins' home town folk of Salt Lake City and a bill asking $10,000 for improvements on Jenkins' car has been placed before the Utah state legislature, it was the opinion in informed circles that Jenkins could not complete his plans in time for a 1939 attempt.

The "Mormon Meteor" which he built last year and did not have an opportunity to use because of the adverse weather at the saltbed is said to have sufficient power to carry him to the distance marks he seeks.

At least one of the major automobile manufacturers is expected to seek newer speeds for stock cars this fall, it was said at Salt Lake City.

HOW can you "tune up" if you can't "tune in" with the right bolt for the right spot when the repair job comes in the door? What's the use of wasting your time dumping out tin cans of bolts, nuts, cotters and cap screws looking for the right size and kind—when you can pull open one of the 15 drawers in the LAMSON Treasure Chest and TAKE OUT exactly the right fastening you need *right away?* Each size packed in its own carton—a standard package costing 25c. All new, clean stock—every piece made to car builders' specifications—genuine replacement parts—in an all-steel cabinet. Make a profit with a LAMSON service stock of fastenings—ask your Jobber about the LAMSON Treasure Chest—or ask us. Use the Coupon.

THE LAMSON & SESSIONS COMPANY • *General Offices:* CLEVELAND, OHIO

PARTICULARS, PLEASE... • CLIP THIS COUPON TO LETTERHEAD AND MAIL

Send us Catalog and Price List for Lamson "Treasure Chest" standard service stock.

Our jobber is _____

Our firm name _____ Address _____

City _____ State _____

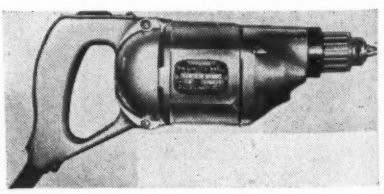
LAMSON & SESSIONS

BOLTS • NUTS • COTTERS • CAP SCREWS • SPECIALS

This advertisement appears in MOTOR AGE—April, 1939 and in MOTOR WORLD WHOLESALE—April, 1939

Black & Decker Has New Utility Drill

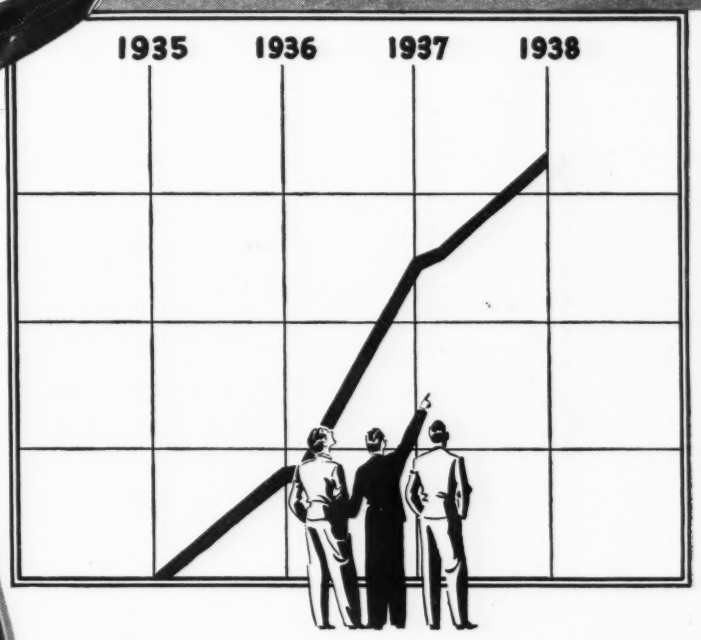
Just what you have been waiting for—a new 5/16 in. Utility ball bearing drill with the plus value of added chuck capacity. A general purpose drill for repair shops and general maintenance work. Has a no-load speed of 1100 r.p.m., and a universal motor of ample capacity for general drilling, carbon cleaning and other service work. Write Black & Decker, Mfg. Co., Towson, Md., for complete details.



"Oh, so all I said was 'get a water pump,' eh?"

TOLEDO IS IN DEMAND

Sales Figures Prove it



THE TOLEDO LINE IS COMPLETE

Valves and Valve Parts
Pistons: Aluminum, Cast Iron
Piston Pins—Chrome-Plated
Cylinder Sleeves
Cylinder Sleeve Assemblies
Engine Bearings
Water Pumps
Water Pump Parts
Tie Rod Ends
Chassis Bolts and Bushings
Shackles: Tryon, Silent "U"
Knee Action Parts

Look at the Toledo sales record. 118% increase in three years. The fastest-growing replacement parts line. It takes quality—real quality—to build a record like that. And garagemen everywhere know from actual use, the higher quality of Toledo products. This and this alone, has resulted in Toledo's amazing sales increase. For your protection, install Toledo replacement parts. Be sure—always order Toledo by name.

THE TOLEDO STEEL PRODUCTS COMPANY, TOLEDO, OHIO, U. S. A.

Warehouses: Atlanta . Boston . Chicago . Cincinnati . Cleveland . Dallas . Detroit . Kansas City
Minneapolis . New York . Philadelphia . St. Louis . Wichita . Los Angeles . San Francisco . Portland . Seattle

Look for the Name

TOLEDO

Mercury Wins Daytona Stock Car Race

It was a field day for Ford in the 160-mile stock car race at Daytona Beach, Florida, on March 19. The ten money-winning places sought by 30 entrants went to drivers of Fords. Although the race over the beach and adjoining highway was billed as a 150-mile event, 50 laps of the 3.2 mile course carried the drivers 160 miles.

Johnny Rice, of Martinsville, Va., was the winner at the wheel of a Ford Mercury. He completed the run in two hours, 16 minutes and thirty seconds for an average of 70.34 miles per hour. Although faster speeds were anticipated, a northeast wind held the peak on the beach to 80 miles per hour. On the south run, over the adjoining highway, the cars averaged some 100 miles per hour.

Rice won $300 first money, plus $100 for 22 prize-paying laps of the 38 he led.

Joe Littlejohn, of Spartanburg, S. C., finished second only 200 yards behind Rice. Less than a lap separated the first six finishers.

Third honors went to Bill France, of Daytona Beach; fourth, Stuart Joyce, of Wanamaker, Ind.; fifth, C. D. "Smokey" Purser, of Daytona Beach; sixth, Lloyd Moody, of Daytona Beach; seventh, Danny Murphy, of Ormon, Florida; eighth, Jimmy Gibson, of Gainsville, Fla.; ninth, Don Suttles, of Jacksonville, Fla.; tenth, Tommy Elmore, of Jacksonville, Fla.

Added to Littlejohn's "take" were prizes for leading laps Nos. 3, 4, 6 and 43. France won laps Nos. 32, 34 and 35.

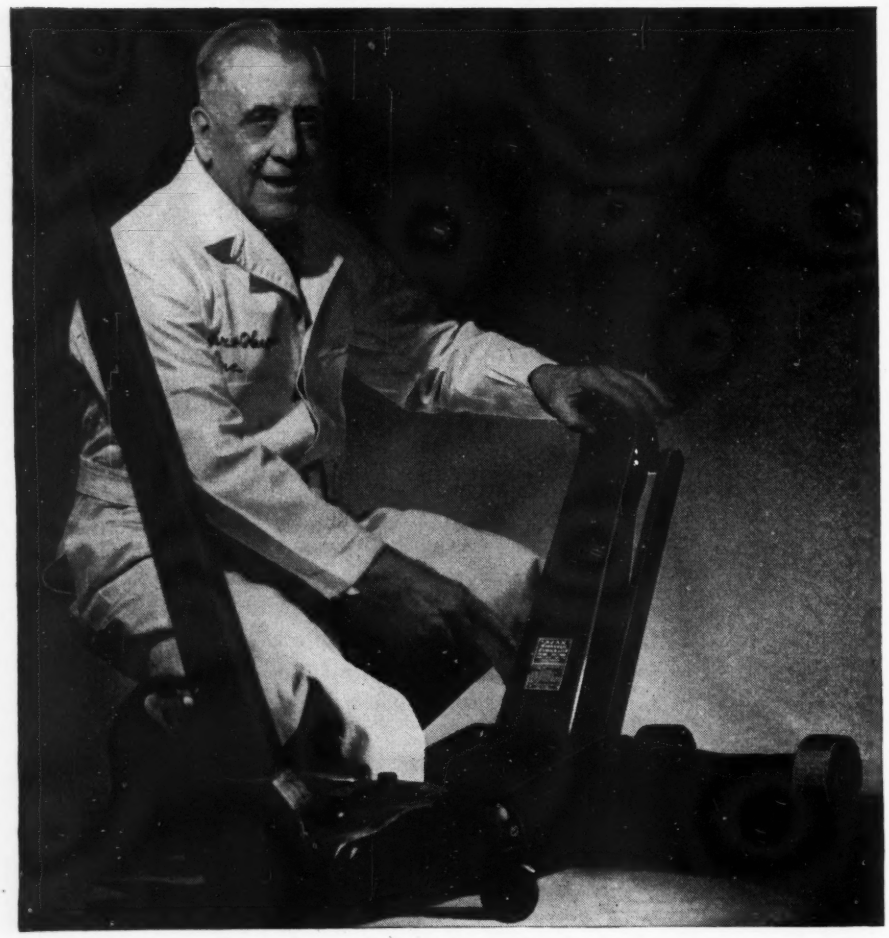
Littlejohn loomed as the winner in the early stage of the race when he set the pace for the first six laps. But Rice jumped into the first slot when Littlejohn upset his car on the south turn in the seventh lap and was forced to the pit for repairs. Spectators assisted mechanics in pushing the mount back on its wheels and Littlejohn went to the pit to straighten out the kinks sufficiently to allow him to finish the grind.

France's bid for top honors was thwarted when his pit crew failed to put in sufficient gasoline during an 11-second pit stop at the 100-mile mark. France was forced to return a second time for gasoline before he received the checkered flag.

Wrecks were confined to the south turn of the course where the drivers came onto the beach from the highway. Robert Baker, of Daytona Beach, turned his Hudson over at that point shortly before M. F. McDonald and Alva Sweigart flipped their cars.

Forced out because of motor trouble were George Asendorf, B. Byron, Joe James, C. R. Cauley and Al Wheatley.

AJAX



THERE'S A JACK YOU CAN DEPEND ON

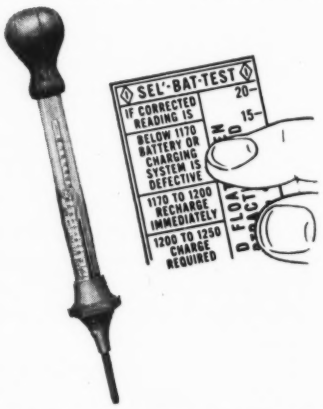
● This hefty-looking "4-tonner," No. 2380, is typical of the rugged power built into every AJAX Jack. For over 20 years the name AJAX has stood for dependability in jacks. See the complete range of portable and service jacks—both hydraulic and mechanical—now on display on your jobber's floor. AJAX AUTO PARTS COMPANY, RACINE, WIS.

A JACK FOR EVERY AUTOMOTIVE NEED

Imperial Offers New Battery Tester

He'll understand what the hydrometer means when you show your customer a reading from his battery with the new Sel'-Bat-Test hydrometer introduced by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill., because the tester has a special plate right on the barrel which translates battery readings into language he can understand.

This new tester is one of a complete line of battery testers being introduced by Imperial. It automatically



corrects for variations in temperature of battery electrolyte by means of a patented thermometer located right in the float jar, which reads directly in terms of amount to be added to or subtracted from float reading.

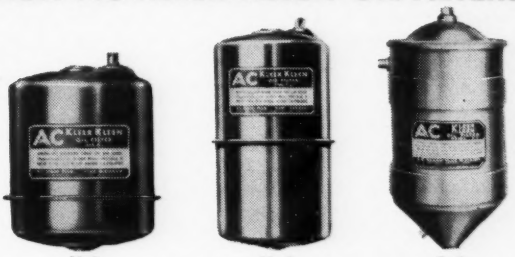
The Sel'-Bat-Test is a working tool and also a selling tool, since it indicates to the customer the exact condition of his battery. Dealer's price $1.05; catalog number 500-T.

NEW!

AC

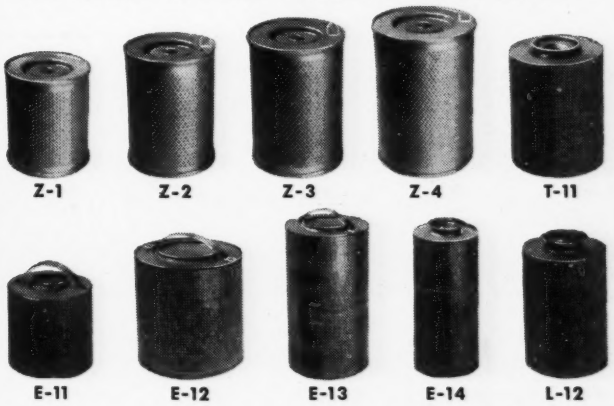
OIL FILTERS AND REPLACEMENT ELEMENTS

3 NEW AC KLEER-KLEEN OIL FILTERS—



X-1 X-2 S-3

10 NEW REPLACEMENT ELEMENTS—



Z-1 Z-2 Z-3 Z-4 T-11

E-11 E-12 E-13 E-14 L-12

AC announces the following new oil filter products:

- NINE AC ELEMENTS which fit the popular sizes of other makes of oil filters.
- X-1 and X-2 FILTER CARTRIDGES with Kleer-Kleen (Igneonite) filtering element.
- S-3 KLEER-KLEEN OIL FILTER for trucks, buses, and tractors with a crankcase capacity of 7 quarts or more (S-13 renewal element).
- T-11 KLEER-KLEEN RENEWAL ELEMENT to fit the T-1 fuel oil filter used as standard equipment on Diesel-powered vehicles.

AC Kleer-Kleen
Standard equipment on

CADILLAC V-16
BUICK—for dusty territories
OLDS, BUICK, PONTIAC } optional

There is now an AC Cartridge or Kleer-Kleen filter—

for initial installation on any vehicle

for replacement (cartridge or element) of almost any other make of oil filter or element

With this enlarged AC line, you can now, with a few types, service practically all oil filter equipped engines. You can sell either a cartridge filter or a Kleer-Kleen filter for the vehicle not equipped. You can sell an AC replacement for the vehicle which is equipped.

MOVE INTO THIS PROFIT MARKET

See Your AC Wholesaler's Salesman

AC SPARK PLUG DIVISION • *General Motors Corporation* • FLINT, MICHIGAN

CSRA Announces Early Race Schedule

Automobile racing in the middle west will get under way April 30 at the new Dayton (Ohio) Speedway, according to the early-season schedule announced at headquarters of the Central States Racing Association there.

The CSRA will extend its calendar into Pennsylvania on May 30 in events run simultaneously at the Sharon and New Kensington Speedways.

Thirty-one races are on the association's card announced by Norman Witte, secretary of the contest board. The present list closes October 10 with the closing program at Dayton, but Witte said other events would be added as the season progresses.

Workmen at the Dayton speedway, formerly a five-eighth mile track, are adding finishing touches on reconstruction which will present a one-half mile high banked course to midwestern fans on the opening date. In line with CSRA requirements for class "A" events, the Dayton sprints will offer a prize purse of $1,400. Dayton's grandstand will have 7,000 individual seats and 1,000 box seats. The grandstand is being roofed in steel. The press and judges' pagoda is on the roof of the grandstand. Twenty-five concrete pits have been build along the inside of the home stretch.

Because of its extended activity for 1939, CSRA has opened a branch office in the Hume-Mansur building, Indianapolis to supervise activity in Indiana, Illinois, Iowa and Kansas.

The schedule so far compiled at offices of the Central States Racing Association in Dayton, Ohio, follows:

April	30	Dayton (O.) Speedway
May	7	Jungle Park, Rockville, Ind.
May	14	Greenville (O.) Speedway
May	21	Fort Wayne (Ind.) Speedway
May	28	Winchester (Ind.) Speedway
May	30	Sharon (Pa.) Speedway
May	30	New Kensington (Pa.) Speedway
June	4	Dayton (O.) Speedway
June	11	Jungle Park, Rockville, Ind.
June	18	Fort Wayne (Ind.) Speedway
June	25	Greenville (O.) Speedway
July	2	Sharon (Pa.) Speedway
July	4	New Kensington (Pa.) Speedway
July	4	DuQuoin, Ill.
July	4	Greenup, Ill.
July	9	Winchester (Ind.) Speedway
July	16	Dayton (O.) Speedway
July	23	Sharon (Pa.) Speedway
July	30	Greenville (O.) Speedway
July	*	Greenup (Ill.) Fair
Aug.	25	Fort Wayne (Ind.) Fair
Aug.	31	Belleville (Kan.) Fair
Sept.	1	Belleville (Kan.) Fair
Sept.	3	Sharon (Pa.) Speedway
Sept.	4	New Kensington (Pa.) Speedway
Sept.	9	DuQuoin, Ill.
Sept.	10	Winchester (Ind.) Speedway
Sept.	17	Fort Wayne (Ind.) Speedway
Sept.	24	Greenville (O.) Speedway
Oct.	1	Jungle Park, Rockville, Ind.
Oct.	10	Dayton (O.) Speedway

* Date to be decided.

Don't let the SPOTS fool you...

It takes a CAR to prove a polish!

Without much *elbow grease* you could use *bear grease* to put a nice bright "spot" on a dull car. But if you really want to know what a polish has . . . and how easy (or hard) it is to use, try it on a turret top job and go the whole distance.

Then you'll find out about polish. And if you'll try Tumbler Liquid Wax on this basis, you'll find out why Tumbler can make claims that have never been *lived up to* before.

Tumbler Liquid Wax combines *for the first time* all the ease of application of the finest liquid polish . . . with the beautiful and permanent result of the finest wax.

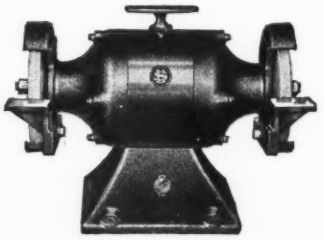
At your wash rack . . . and in your specialty department you'll find it a money-maker.

J. A. TUMBLER LABORATORIES
Baltimore, Md., U.S.A. • Toronto, Canada

Tumbler Liquid Wax is a chemical achievement that has taken years to perfect. Through the development of an exclusive homogenizing method, the emulsification of Tumbler Liquid Wax affords a completely dispersed, fine colloidal sol. Hard brittle waxes are reduced to a tempered film and the emulsified, sub-microscopic particles spread so finely that a minimum of rubbing effects an optically plane surface that is highly lustrous and greatly resistant to dirt, dust and finish oxidation.

Bench Grinder Improved

If you are looking for trouble-free service in a bench grinder, you'll find it in the new improved "Skipper," a 6-in. grinder made by the United States Electrical Tool Co., 2483 West Sixth St., Cincinnati, Ohio. Motor is capacitor type, totally inclosed. It



has no commutator, no brushes and no centrifugal switches and will not burn out even though repeatedly overloaded. Wheels are 6 in. diameter, ⅝ in. face, ½ in. hole. Comes equipped with one fine and one coarse grinding wheel. For full details, write the manufacturer.

N.B.M.A. Spring Convention

The National Battery Manufacturers Association will hold its 1939 Spring Convention at The Greenbrier Hotel, White Sulphur Springs, West Virginia—May 11 and 12, 1939. All members of the industry are cordially invited to attend. An interesting and informative program is promised.

KOETHERIZING TAKES THE GAMBLE OUT OF MOTOR JOBS!*

*Regardless of what piston rings are used . . . regardless of cylinder or piston condition . . . *every piston you pull should be Koetherized before re-installation.* Koetherizing permanently corrects skirt collapse and restores original factory clearances without the use of "spring" expanders or tricky gadgets.

Koetherizing costs no more than expanders . . . but it makes pistons *better than new* because Koetherized pistons will not collapse again!

Koetherizing makes any ring job a better job!

Koetherizing will give your customers the most economical assurance of quiet running engines, and you can depend on 100% customer satisfaction. Write for the name of the nearest Koetherizing jobber.

KOPPERS COMPANY, American Hammered Piston Ring Division, Baltimore, Md.

KOETHERIZING

A national service available through jobbers of

AMERICAN HAMMERED PISTON RINGS

State Legislation

More than 3000 bills have been introduced in legislatures of the various states so far this year affecting highway transportation and highway users, according to the Automobile Manufacturers' Association.

Taxation is a moot question, with several states proposing to increase bus and truck fees, one state proposing to increase the gasoline tax and several others seeking to make permanent temporary gas taxes which are now in effect. Against this movement, five states are considering general reductions in gasoline taxes, while others are considering modifications of various kinds.

In addition to the 30 states in which deferred registration dates are now in effect, a number of others are proposing to adopt this plan.

Eight state legislatures are canvassing the possibility of constitutional amendments prohibiting the diversion of automobile tax monies from employment beneficial to highway users, and in one other a referendum is awaited.

Ten states would increase speed limits, four of them to 50 miles an hour, four others to 60, one to 45 and another to 55. A new proposal offered in two states is that of fixing a maximum speed limit for night driving.

Drunken driving is engaging the attention of many state legislators. Some are considering revision of penalties, others the imposition of special medical tests. One state would prohibit the sale of gasoline to drunken drivers, while another would impose total abstinence as a condition in securing a permit to drive a car.

KEEP YOUR TOOLS

SAFE

FROM BORROWING HANDS

Good tools are expensive to replace—that's why so many auto repair shops find they actually save money by equipping with

Fig. 1112

"HALLOWELL"

STEEL TOOL STANDS

In them, tools can be kept safely under lock and key when not in use, yet they're always handy when needed. Perforated sides make the contents always visible and prevent fumbling. Two casters are provided so the stands may be pushed around by handles which swing out of the way when not in use. Cost of these stands is low. Write now for full details.

"HALLOWELL" STEEL WORK-BENCHES

Convenient—Long Lasting—Inexpensive

"Hallowell" Benches are exactly suited for auto repair service. Their one piece steel tops are always smooth and provide a lasting, ideal surface for handling intricate work. Heavy parts dropped on them will not cause them to splinter or split, nor can they get oil soaked and become fire hazards. Flanged leg constructions keep them firm, yet they're easy to take apart for setting up in new locations. You can't do that with wooden benches.

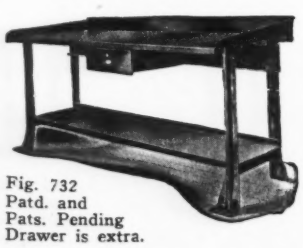


Fig. 732
Patd. and
Pats. Pending
Drawer is extra.

The semi-portable bench at the right has the added feature of casters on two legs and handles for pushing the bench from job to job.

Write for our Shop Equipment Bulletin.

Fig. 992

STANDARD PRESSED STEEL CO.

BRANCHES: BOSTON, DETROIT, INDIANAPOLIS

JENKINTOWN, PENNA.

Box 561

BRANCHES: CHICAGO, ST. LOUIS, SAN FRANCISCO

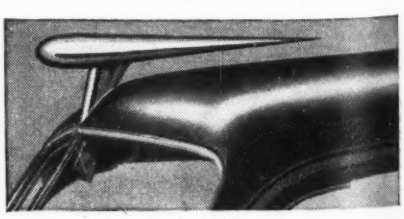
Aro Announces New Flushing Oil Heater

You'll be changing gear lubricants soon, and that means flushing out the old grease. The new Aro flushing oil heater combined with the Aro two-way gear flusher will help you speed up this work and at the same time do a thorough job. While the heater has a capacity of 6½ quarts of oil,

it is unique in that sufficient oil for one flushing is thermostatically heated to proper temperature while at the same time additional supply is being warmed by radiation. This means that, as the gears are being flushed, the Heater is rapidly heating enough flushing oil for the next job. All is automatic, a pilot light shows when the unit is "on." Aro Equipment Co., Bryon, Ohio.

Radio Antenna

Streamlined beauty features the new Rose Zephyr Auto Radio Antenna introduced by the Frank Rose Mfg. Co., Hastings, Neb. Its large surface is said to develop strong signal strength without distortion from wheel or tire static, high speeds or directional changes. Rain, snow or



ice do not affect its efficiency. Made of stainless steel with a rustproof mirror-like finish. A single bolt mounts it permanently and solidly, with no possibility of vibration. For complete information and prices, write the manufacturer.

MISTER... YOU'LL REALLY SELL BATTERIES WITH THIS EXCLUSIVE FRANCHISE!

MAKE FATTER PROFITS WITH THESE VESTA SPUN-GLASS BATTERIES

KATHANODE: *"Guaranteed as long as you own your car." The finest battery money can buy.*

VESTA ROYAL: *Guarantee and adjustment period: 2½ years. Spun-glass construction at new low price.*

VESTA'S unique Plate-Lock feature makes customers stop, look and buy

HERE'S a battery that gives you exclusive features no other construction can match. It's VESTA . . . with the exclusive Plate-Lock Protection — a feature so important it will help you sell *more* batteries and *better* batteries to even your toughest prospects.

Check these exclusive Plate-Lock selling points:

- Corners and edges of plates cannot cut through separators.
- Plates are evenly spaced — each bears an equal load.
- Buckling danger reduced because of reduction of heat.
- Separators stay in good condition much longer.
- Separator grooving protected. This allows free circulation of acid and escape of gas.
- No chafing of plates or separators. No internal vibration.
- No short circuits; battery life greatly increased.

Here's the battery that gives you exclusive talking points. Write for exclusive franchise.

VESTA CONSOLIDATED, INCORPORATED, CHICAGO

VESTA BATTERIES

EXCLUSIVE FEATURES—EXCLUSIVE FRANCHISE—HIGHER PROFITS!

P.C. Stresses Safety In Ring Campaign

The fact that new piston rings can make an important contribution to safer driving by increasing the power and efficiency of automobiles will be emphasized in the 1939 national consumer advertising of the Perfect Circle Co. Complementing former appeals to economy through the use of new rings to stop oil pumping, the new campaign is expected to broaden materially the market for piston rings.

The new campaign dramatizes the danger of driving cars that do not have sufficient power to respond immediately to the throttle in emergencies. One of the first advertisements in the new series features a frightened driver and his wife, and the headline: "I froze to the wheel —my car was half-dead."

"Thousands of cars in service today lack the extra push so necessary in emergencies," says George W. Stout, advertising manager. "Cars only two or three years old probably predominate, as older jallopies are seldom depended on for the quick acceleration required to pass other cars or to meet other emergencies.

"Heretofore piston ring advertising has stressed oil pumping almost to the exclusion of other factors. We are going to change this order by telling motorists of the improved safety, as well as power and efficiency, which results from rejuvenating half-dead cars."

● THEY BEAT A PATH TO THE DOOR OF THE MAN WHO MADE A BETTER MOUSE TRAP.....

● UNTIL THEY TRIED IT, THEY NEVER KNEW IT COULD BE BETTER..YET COST NO MORE!

● Science advances! New Knowledge!

Chemical Achievements! Modern as tomorrow!

Now . . . the perfect seal for cracked valve ports, cylinders and water jackets.

Now . . . a guaranteed permanent repair for cast iron and aluminum heads.

Now . . . WELDEX . . . the perfected seal, uneffected by any anti-freeze, it seals instantly and is easy to use.

And . . . KOR SEAL . . . the new and proven seal for leaky radiators and gaskets. Now, a guaranteed repair job can be done on copper parts.

Attractively packaged, priced for easy selling, sold at substantial discounts.

● ●

From Your Jobber or Write to Us Direct

WELDEX THE PERFECT SEAL

KOR SEAL

UNIVERSAL SELLING CO.
5109 N. Marion St., Philadelphia, Pa.

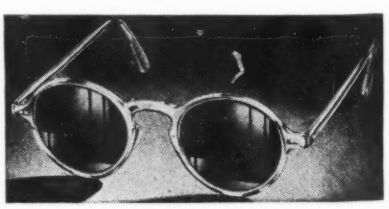
Acme Rubber Valves

Don't throw away the tube because the valve pulled out. Install an Acme rubber valve made of pure gum rubber, tempered for extra toughness and long life. The feather edge base has cushion gum contact face, covered by

a protective linen disk to keep the surface clean and the gum fresh, ready for instant application. The stem takes either a long or short core of the standard type. Acme Air Appliance Co., Inc., 254 Park Ave., Brooklyn, N. Y.

Polaroid Day Glasses

A new anti-glare driving glass, using Polaroid lenses to eliminate road glare, and retailing for $1.95, is now being offered to the automotive trade by Polaroid Corp., 285 Columbus Ave., Boston, Mass. They are designed

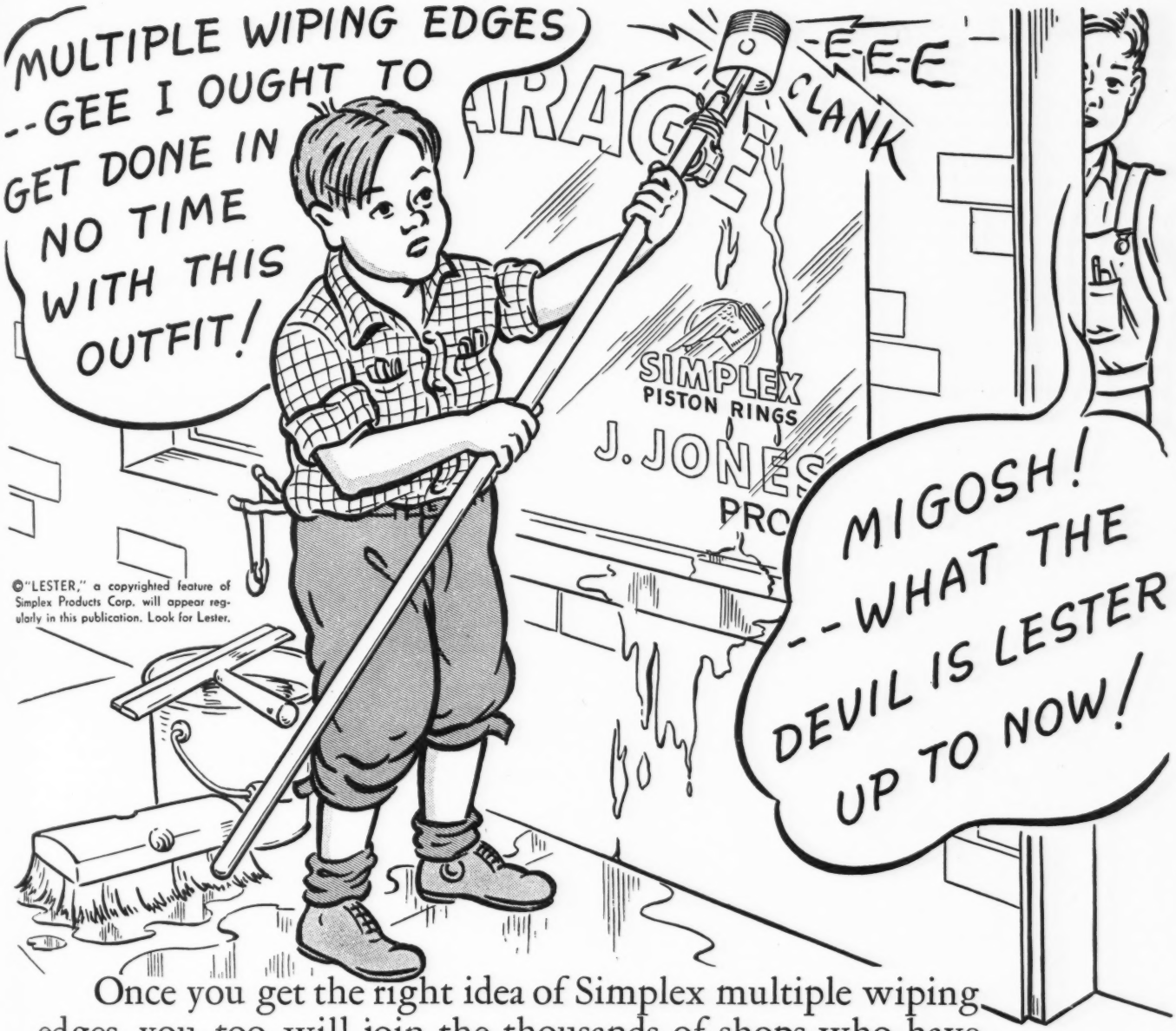


only for use against daytime glare—not against headlights.

The Polaroid lenses darken only slightly the things you want to see but darken very greatly the blinding glare reflected from highways, water, ice and other glaring surfaces.

New Gas Pump Hose

No more jockeying for position because the gas pump hose won't reach the gas tank in the car. With the new EXTENDAHOSE announced by The Wayne Pump Co., Tecumseh & Cochran Sts., Fort Wayne, Ind., the customer can stop his car so that he is seated directly in front of the dial of the pump, and the hose will reach. It is a 14-ft. self-retrieving hose applied to Wayne pumps, and is long enough to reach around two cars if necessary, without the hose touching the ground.


MULTIPLE WIPING EDGES --GEE I OUGHT TO GET DONE IN NO TIME WITH THIS OUTFIT!
-E-E-E
CLANK
SIMPLEX PISTON RINGS
J. JONES
PRO
MIGOSH! --WHAT THE DEVIL IS LESTER UP TO NOW!
©"LESTER," a copyrighted feature of Simplex Products Corp. will appear regularly in this publication. Look for Lester.

Once you get the right idea of Simplex multiple wiping edges, you, too, will join the thousands of shops who have adopted this highly efficient, low priced method of reconditioning cars. The same method that used car dealers everywhere are using for reliable, low-cost reconditioning, to help boost sales.

Multiple ring sections assure correct lubrication without oil waste and proper compression seal without drag. No breaking-in required. Call your nearest Simplex distributor on your next job. You'll save your customer money and still make a good profit.

46¢ LIST
VOLUME PRICES *for* VOLUME CARS

EXTREME FLEXIBILITY OF SIMPLEX RING SECTIONS PERMITS RINGS TO HUG, EVEN TAPERED OR DISTORTED CYLINDER WALLS.

SIMPLEX PRODUCTS CORP.
3820 KELLEY AVENUE • CLEVELAND, OHIO

SIMPLEX PISTON RINGS

"A Better Ring for Less Money"

Sampson Returns to Auto Race Game

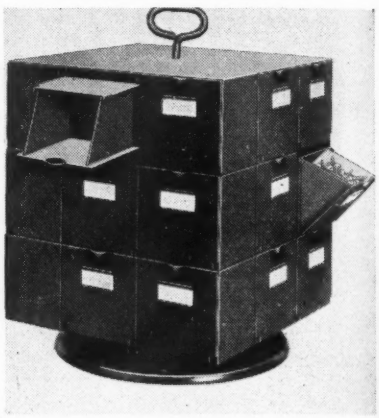
A mighty Sampson of auto racing is letting his hair grow to again enter the lists at the Indianapolis Motor Speedway on May 30. Alden Sampson the Second, original "angel" for Lou Meyer, most consistent winner of all times, has announced the entry of the "Sampson Comet" in the 500-mile classic over the Hoosier oval here on Decoration Day.

Although a driver has not yet been named for the new car, the announcement brings with it memories of 1928 and the late Frank Lockhart, for Sampson will use a revised edition of the famous 16-cylinder motor that Lockhart used in his fatal attempt to set a new world's straightaway record at Daytona Beach.

Sampson was just a spectator at last year's race, but speed was in the blood and this year's entry is the result. "We have formed a new company, Riley Brett, Leo Goossen and myself, to attempt to fulfill the best demands of big-time automobile racing and we hope to be able to show the boys something this year with a brand-new chassis and a well-tried motor," Sampson says in putting in his new bid for fame.

Stores Small Parts

Do you have trouble finding screws, bolts, contact points, fuses and other small parts? Why not keep them in this new Spin-A-Bin, with a label on the front of each compartment so you'll know what's inside? This revolving assembly of welded steel bins,



all in one compact unit, is a time saver in the shop and a merchadise mover on the sales counter. The unit contains 24 bins each 3 in. x 3 in. x 2½ in., or it can be secured in bin size 4 in. x 4 in. x 3 in. Noggle Products Co., Ann Arbor, Mich.

Hydraulic Brake Service Kit

Servicing the hydraulic brake cylinders requires the replacement of all parts, not just one, if a complete job is to be done. The selection of parts is made easy with the new Quick-Service Hydraulic Brake Kit announced

by Champ Items, Inc., 6191 Maple Ave., St. Louis, Mo. Each kit is sealed and marked with contents and interchangeability, and all parts are kept clean and ready for instant installation. Parts may be purchased separately if desired, but the kit saves time and insures a more satisfactory job—and more profit.

Or Else . . .

From the office of the American Commercial Attache in Tokyo comes word that some time in March or April gasoline allotments for private cars in Japan will be discontinued. Owners will be left with the choice of installing charcoal burning or other substitute fuel equipment, or selling their vehicles to commercial organizations or the military forces, or of placing the cars in storage until such time as the "present emergency ends."

It's always

"GOOD TIMES"

on the Hygrade Money-Go-Round

GET aboard the Hygrade Money-Go-Round and make your business spin! Things move at a fast clip when you service the fields covered by Hygrade—with Hygrade's standard, engineered parts and simplified replacement methods back of you. A steady stream of jobs in branches of overhaul that yield THE BEST PROFITS! New sources of revenue that PAY HANDSOMELY!

Hygrade's set-up has proven a little gold mine for thousands of shops. We were the first to make specialized branches of repair practical for the trade in general. We developed "Engineered" replacement parts and originated the famous Contain-All Kits for replacing ALL THE PARTS in carburetors and fuel pumps, insuring a satisfactory job.

Hygrade special tools and testers speed up your work. Hygrade literature is by far the most educational—of priceless value to the repairman.

An attractive picture! Can you afford to stay out of it? Get aboard the Hygrade Money-Go-Round—Today!

Write us direct for full particulars if your jobber can't supply you, being sure to enclose his name.

HYGRADE PRODUCTS CO.
516 West 34th Street, New York

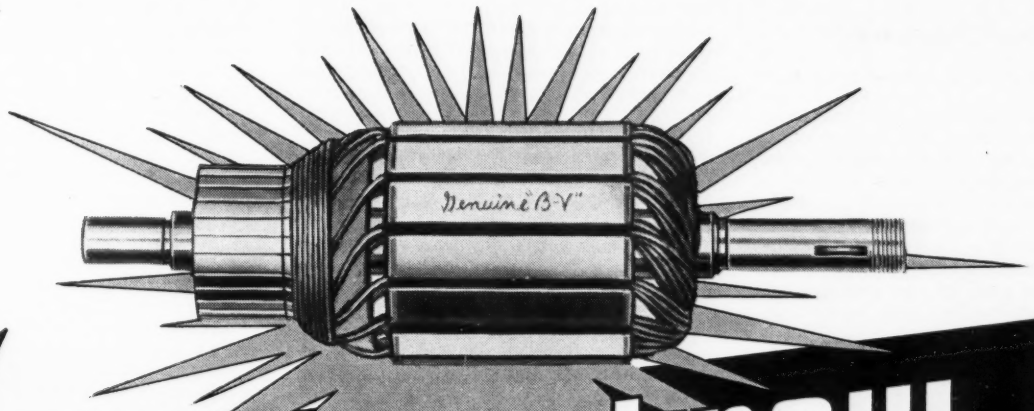
Our Slogan to The Repairman—
Don't BUY Labor—
SELL it.

Do your own work and use HYGRADE REPLACEMENT PARTS

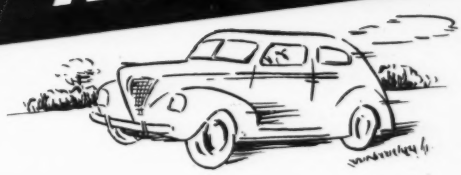
Facsimile Service Parts for
CARBURETORS
FUEL PUMPS
SPEEDOMETERS
SHOCK ABSORBERS
TEMPERATURE GAUGES
FUEL LINES AND FITTINGS

"HYGRADE"

Hygrade Line AUTOMOTIVE PRODUCTS



Those who know Armatures best Appreciate B·V Most



GENERAL ARMATURE CORPORATION — QUALITY SERVICE EXPERIENCE

Whether it is in watches, radios, automobiles or anything else, one always stands out as "tops." That is the way it is with GENERAL'S De Luxe "B-V" (balanced-ventilated) armatures.

Not because of any frills. Not because of big advertising. But because "B-V" (balanced-ventilated) armatures' construction, performance and lasting benefits are proof against come-backs on your services.

"B-V" armature superiority is inbuilt. For example: The all new materials from end to end . . . the patented process *form wound* cooled coils of correct diameter, size and number of turns that assure perfect electrical and mechanical balance . . . the surplus core metal that reduces heat and failure . . . the infinite care in testing and finishing. No wonder those who know armatures best appreciate Genuine De Luxe "B-V" most!

Send for complete information about Genuine General "B-V" (balanced-ventilated) Armatures; also on General's Service Armatures and Generators—all now priced lower than at any time in the company's history.

NEW GENERATOR REBUILDER

Increase your generator and electrical parts business. Complete equipment and set of special tools, plus electrical test bench for those not so equipped, for dismantling and reassembling generators quickly, economically and without damage to any part. Send for literature and prices today.

Address Dept. 4-B

GENERAL ARMATURE CORPORATION

World's Leading Manufacturer of Armatures Exclusively for Replacement

LOCK HAVEN, PA. **CHICAGO, ILL.**

GENERAL

ARMATURES ★ GENERATORS ★ FIELD COILS

Sales Appeal

(*Continued from page* 21)

types of old equipment and the check-up will reveal what should be done to eliminate hazards to employes as well as to customers' cars.

State of repair or operating condition covers a wide range of situations. Frequently equipment can be brought back to good condition by replacement of worn parts and by the addition of new attachments that will modernize it. Sometimes equipment is so badly worn that the cost of operation is excessive and the money saved by lower operating costs of new equipment will go a long way towards paying for it over a short period of time. Manufacturers are constantly bringing out new attachments to bring their older equipment up to date or to increase its versatility and the jobber salesman is in a good position to show what can be done in each instance.

Age of the equipment is closely related to its operating condition but there are several things to keep in mind in this connection. First the equipment may be so slow or so inadequate in its ability to meet requirements of today's cars that it definitely costs too much to use, if it can be used at all. In that case, it probably should be slated for early replacement. This applies particularly to many types of engine reconditioning equipment. Also some types of equipment are so definitely dated that their appearance gives them away. No shop anxious to impress its trade with the modernity of its methods can afford to include them in a set-up which employs appearance and showmanship in its merchandising appeal. In most instances, for example, grease racks and pits tell an obvious story that the progressive shop cannot afford to have emphasized.

Adequacy or capacity also are related in some respects to age and operating condition, but there are several other things to keep in mind and conditions vary with different types of equipment. As a result, the idea can only be touched upon briefly here but any shop operator giving the matter careful thought will come across many places in which this situation applies to his equipment. Air compressors, for example, may have been bought originally for tire service. New demands for air have constantly been added such as spray painting, operating hydraulic lifts, grease guns, engine, body and chassis cleaning, spark plug cleaning, fender hammers and even garage doors. The compressor may still be in condition to deliver maximum air requirements but it has to run almost continuously to do so. That naturally shortens its life while the cost of continuous operation is so much greater than running a larger capacity compressor for short intervals that the additional operating costs alone would pay for the large compressor in a couple of years, according to manufacturers.

Aside from the adequate size or capacity of a piece of equipment, and aside from its ability to service new as well as older models, is the question of number of units. Studies show that garage jacks are used in 85 per cent of all service operations or preliminary inspections, so there always is the question as to whether the shop has enough jacks.

From a slightly different angle, consider greasing equipment. Any shop offering complete specialized lubrication on all makes of cars must have a certain minimum number of guns and lubricators to meet the varying requirements of different makes and models of cars. Here's a list suggested by one well known manufacturer: high pressure chassis lubricator, three metered gear lubricators (one for "regular," one for "EP," and one for "Hypoid"), gear flusher and flushing oil heater, wheel bearing washer and packer, water pump gun, two hand guns for fibrous lubricants (universal joints and wheel bearings), fluid lubricant hand gun for steering gears and oil type universals, spring lubricant hand gun, clamp and spring packer for metal covered leaf springs, spring oiler for uncovered springs, pistol oilers for motor oil and light oil, pistol oiler for rubber shackle, lubricant, pistol oiler for filling shock absorbers, and waste oil drain.

Another interesting slant on adequacy is being emphasized by a prominent lift manufacturer who points out that a service establishment should have a sufficient number of lifts to adequately handle the maximum amount of customer traffic that

There's a Set for every Motor —INDIVIDUALIZED to the Job!**

Dran-Bac "H" Sets are not a mere combination of rings in a box! "H" Sets are *designed* for the motor and *built* to cure piston ring ills in that motor .... in-other-words "H" sets contain the RIGHT rings for the job .... individualized to *every* job! "H" Sets have the famous

Dran-Bac
Sectional Oil Rings

—with their remarkable *Aroloy Segments, Large Oil Vents, Welco Finish, More Wiping Edges, Swedish Steel Expander, 4-Way Flexibility, All Sections Contacting Cylinder Wall,* no oversizes, no open gaps and no fitting.

1. Aroloy. 2. Grey Iron. 3. Expander.

And then there's the *Multi-Compression* ring with its greater heat dissipation and no open gaps for its compression-sealing ability—the *Welco Compression* ring and the *Bevl-Chanl* oil ring all individualized to the job!

Why be satisfied with less? "H" Sets top all for performance. Stop oil pumping in motors often regarded as needing reboring. Ask your jobber or send for literature.

THE WEL-EVER PISTON RING CO.
Toledo Ohio U. S. A.

* Rolled tin finish Aroloy Segments.

** "H" Sets are available in standard and 5 oversizes.

*** Licensed by Hastings Patent to Phillips, No. 2148997.

Wel-Ever PISTON RINGS

can be expected to come in at any given time. Lifts these days are used for so many services besides lubrication that one lift in a busy shop hardly is enough because customers these days refuse to wait for service. The idea is to have sufficient lift capacity at all times to take care of the maximum number of customers; and when this condition is met, additional customer traffic is attracted because everyone welcomes prompt service. We know of one large car dealer in Detroit who has 11 lifts in his service department.

Much more might be said about checking the shop's equipment, particularly from the standpoint of special services that the shop is able or wants to offer—but that's a story in itself. If the points enumerated here are covered in a checkup, any shop operator will have a much better picture of where he stands and where he wants to go.

Ignition Cable Sets

Sterling Steelductor, new stainless steel high tension cable, is now available in boxed sets for popular cars. Wires are cut to correct lengths and, wherever possible, distributor clips are soldered in place, and cylinder numbers clearly marked on the wires. A special Ford set is available, and includes a loom or auxiliary conduit to take the generator and primary lead wires that normally run through the regular spark plug wire conduit. The extra loom is clamped along the under side of the regular conduit. The Sterling Cable Division of the Electric Auto-Lite Co., Port Huron, Mich.

Whiz Adds New Items

To its already impressive list of automotive items, R. M. Hollingshead Corp., Camden, N. J., makers of WHIZ products, has added two new items; HO-ZOF, a degreasing fluid

for washing motors, parts, garage floors, etc., and HUSH-SHAK, a rubber shackle lubricant which is said to eliminate squeaks from rubber shackles, bushings, shock absorber arms and body mountings.

King Quality Ring Sets

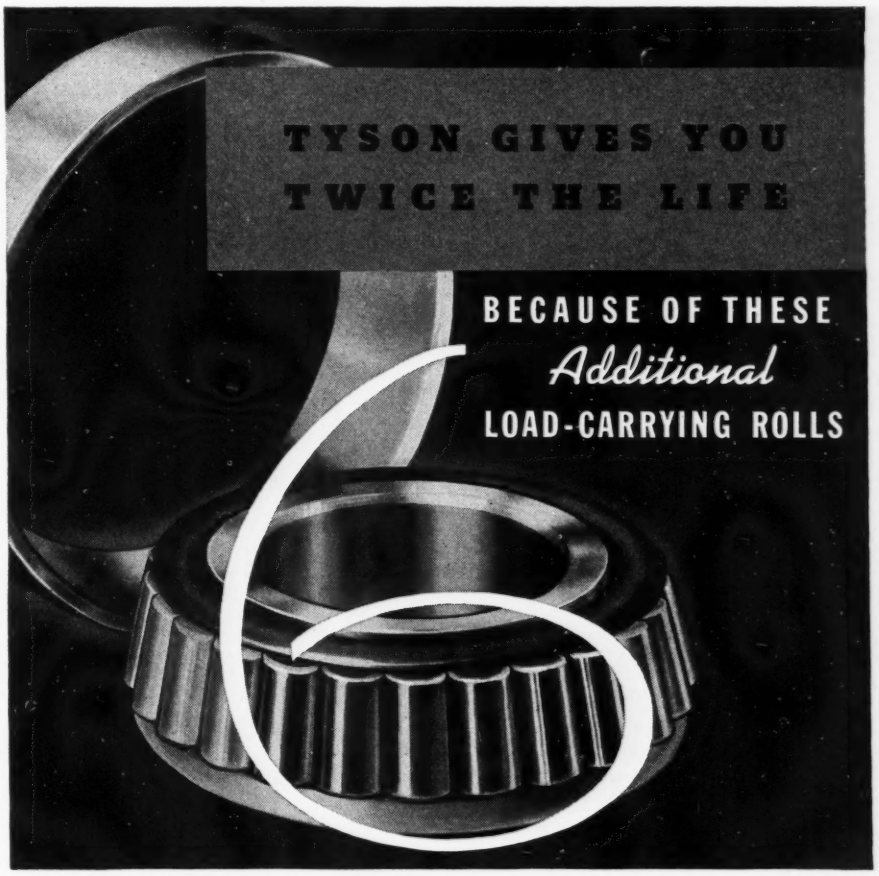
Now repairmen can have engineered sets of King Quality Piston Rings for all popular cars. Engineered sets are packaged in a separate container for each model, and include a blue print instruction sheet for that particular set. One side of the blue print shows groove depth, material, specifications and the proper piston expander required for that job. The other side shows the necessary operations for engineered motor reringing. King Quality piston rings are Altinized, providing an increase in the natural life of the rings. King Quality Products Co., 2320 Cooper St., St. Louis, Mo.

Iron Diagnosis

The family automobile is being diagnosed for iron in its lubricant stream. Actual measurement of metal removed from cylinder walls during engine operation and collected in lubricating oil is the most direct measurement of cylinder wear so far devised, researchers believe.

With apparatus which can detect extremely minute quantities of iron compounds with an accuracy of one part in 50,000,000, lubricating oil samples taken from four new and identical engines at regular intervals during simultaneous test runs showed increasing iron content with time.

Among the interesting observations made was the fact that changing piston rings multiplied iron content of oil samples 15 times in the first runs following the change. Scoring, which occurred in one engine, increased the iron content considerably. Simply lifting a piston out and returning it doubled the iron content.



● The Tyson *Cageless* Tapered Roller Bearing has 30% more rolls—and therefore 30% more load capacity—than a conventional cage-type bearing. Tyson also doubles bearing life, and assures maximum rigidity. *Tie up with Tyson now!*

Cageless FOR HARD SERVICE *Cage-type* FOR REGULAR SERVICE

Tyson

TYSON ROLLER BEARING CORPORATION, MASSILLON, OHIO

Legally Speaking

(*Continued from page* 83)

a child who is hurt while touching or playing with the dangerous object. This liability is imposed on him even though the child had no business to go near the dangerous object and would ordinarily be considered a trespasser.

An Illinois court recently put it this way:

"Generally speaking it may be said that one who maintains dangerous instrumentalities or appliances on his premises of a character likely to attract children at play, or permits dangerous conditions to remain thereon with the knowledge that children, regardless of age, are in the habit of resorting thereto for amusement, is liable to such children as are injured thereby."

The court further stated that it is immaterial whether the dangerous objects are visible from the street or from some other place where children may be expected to be. The question of whether or not the dangerous object is naturally attractive to children is usually left to the jury to decide.

Machines, tools and implements with sharp cutting edges, and other objects of a mechanical nature, are examples of items attractive to children and which might hurt a child playing with or near them.

Greasy Pavement

A customer of a store, while walking across a greasy concrete pavement, slipped on a grease spot and was hurt in the resultant fall. She sued the store for her injuries.

The concrete pavement was maintained by the store proprietor as a parking space for his customers and there was no other means of leaving the store except across this pavement.

After hearing the case the Ohio court said:

"The facts show clearly that this injured lady was aware that the concrete pavement in front of the store was and for a long time had been used as a parking space for customers and that it was stained by oil which had dripped from parked automobiles. She herself had used it many times for parking purposes.

"The store was not required to continuously place a guard or employe to warn parking customers of that which was plainly visible. This injured lady assumed the risk of the plainly evident condition of which she complains. It was broad daylight and, according to her own story, she knew the recurring condition of the parking space from oil which fell from the cars continually parked there."

In view of these conditions the court felt that the store proprietor was not responsible and set aside a verdict previously given in favor of the injured customer.

GRAB A CHUNK OF *PLUS* SERVICE BUSINESS

by "Blowing Car Noses" With

The MASTER AIR-STRAINER CLEANER

With every overhaul or tune-up job you get a car "nose blowing" job. With a MASTER CLEANER in your shop you can add 50¢ profit to every bill. At 50¢ a "blow"—the standard charge for this PLUS service—you can pay for your MASTER STRAINER in a few weeks. From then on it's velvet. With the MASTER CLEANER you can not only give greater satisfaction to your present customers, but you can attract new customers. Get a MASTER CLEANER today and grab a chunk of PLUS service business.

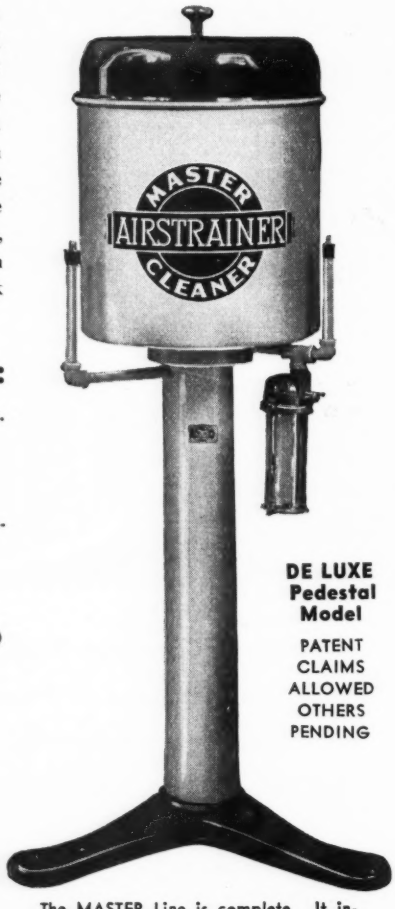
Consider These Features:

- New—has features found in no other cleaner.
- Fast—takes only a few minutes.
- Simple—extremely easy to operate.
- Thorough—removes all the dirt.
- Economical—requires only 2 gallons of kerosene, which can be used over and over.
- Takes continuous full air line pressure.
- Smart design—sturdy construction.

Deliveries in standard colors: (a) red; (b) blue; (c) red and white.

FOLLOW THESE 7 EASY STEPS

1. Lift strainer out of car.
2. Set it over the cup in the MASTER CLEANER.
3. Pour in 2 gallons of kerosene.
4. Turn on the air pressure for a minute or two.
5. Dry the strainer.
6. Re-oil the strainer.
7. Replace strainer in car.



DE LUXE Pedestal Model

PATENT CLAIMS ALLOWED OTHERS PENDING

The MASTER Line is complete. It includes the Bench Model at $12.75, the Pedestal Model at $16.75, and the Deluxe Model (above) at $19.75.

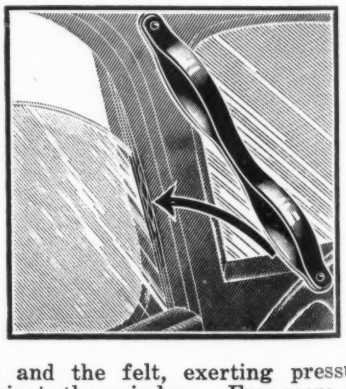
TIRE TRACTOR CORPORATION

OFFICE:
6908-10 Market Street
UPPER DARBY, PA.

PLANT:
3rd and Price Streets
CHESTER, PA.

Window Anti-Rattler

No more annoying window rattles if you use the new Champ Item No. 910, a window anti-rattler which is slipped in between the window channel and the felt, exerting pressure against the window. For more information on this item and the other time-saving service items, write Champ Items, Inc., 6191 Maple Ave., St. Louis, Mo.



Accessories Show

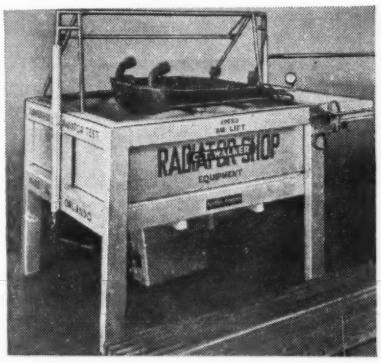
Chicago's sixth annual Automotive Accessories Exhibit will be held on the Navy Pier, August 7-10, according to announcement made by the Automobile Accessories Association, Inc.

Average Mileage

City folks apparently drive almost 2000 more miles a year than people living in the country according to a survey completed by the Automobile Manfacturers Association. The new average mileage for all cars is set at 8850 miles per year. City-owned cars travel 9540 miles a year; rural cars, 7630. The average for all trucks is 10,100 miles annually.

Radiator Test Tank

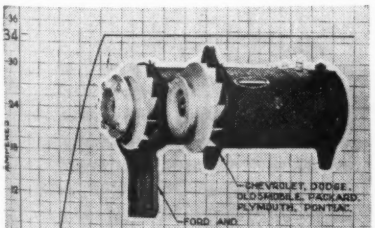
You've been waiting for this — a radiator test tank equipped with air hoist. The tank is metal, 36 in. x 48 in., with wood frame. The air house is mounted under the bottom and comes up from each end. The work rack is made of heavy pipe with wood



slat rack to hold the radiator. Radjator can be tested either flat on the rack or standing upright. One size will test any radiator. For complete information and prices, write C. T. Walker Radiator Shop, 621 West Central Ave., Orlando, Florida.

Hi-Output Generators

If you are having trouble keeping batteries charged, why not install one of the new Delco-Remy Hi-Output generators? Various mountings make them adaptable to most passenger car and light truck jobs. They are shunt type units, with output con-



trolled by current and voltage regulator, and reach a maximum output of 34 amperes at 20 to 22 m.p.h. These generators are distributed by United Motors Service branches and their authorized electrical service stations. Additional information will be supplied upon request.

Operating Cost Cut

Since 1925 the cost of operating a popular priced car has come down 40 per cent, due chiefly to lower repair and tire expense, a study by the Automobile Manufacturers Association reveals.

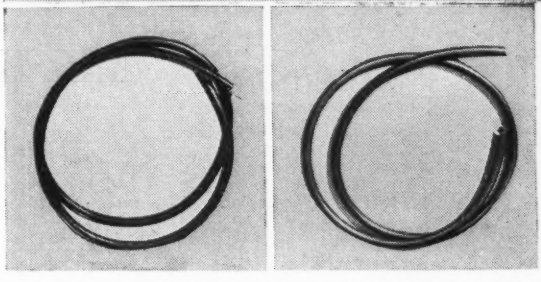
Data contributed from operating records of six different companies, incorporating the performance of 30,000 motor vehicles in all weathers and on all roads, including service in city and country were the basis of the study.

The study focused attention on provisions which make repairs and replacements less frequent and reduce overall maintenance costs. Overhauling the engine, formerly required every 30,000 miles, is now deferred to 60,000 miles or longer, while the cost is generally less, due to simplified design and greater simplification and interchangeability of parts.

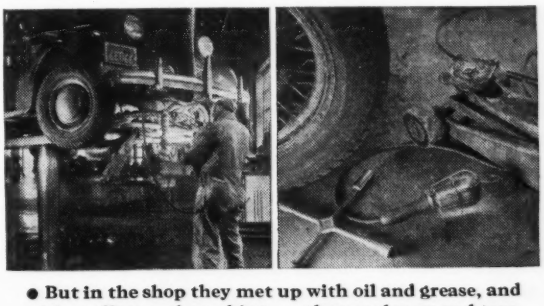
Hudson Gets Patent On Braking System

The Hudson Motor Car Co. has been granted patent No. 2147955 covering the safety principles of hydraulic plus mechanical reserve brakes, described by the company as Hudson "Double-Safe" hydraulics since their development in 1936. Named in patent papers as the Baits patent, the claims cover an automobile braking system having hydraulically actuated mechanism and mechanically actuated mechanism for applying the same set of wheel brakes, both systems controlled and operated by the same brake foot pedal.

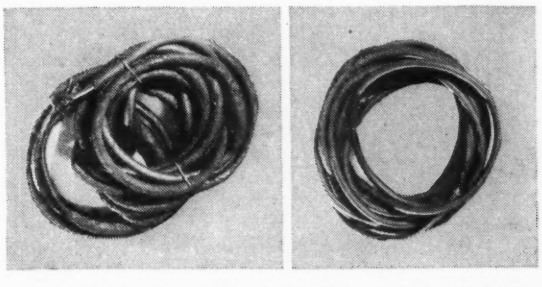
WHAT A BEATING THIS NEOPRENE PORTABLE CORD CAN TAKE!



● Here are two sections of lamp cord recently tested under actual service conditions in a repair shop. One is rubber-covered and the other is neoprene. You see they looked just alike . . . *at the start.*



● But in the shop they met up with oil and grease, and with scuffing and crushing . . . the usual wear and tear.



● After only six months, the rubber-covered cord (left) was swollen, cracked, ready to be replaced. While even after a whole year, the cord covered with neoprene (right) was still in its prime, with many months of economical service ahead.

ASK YOUR regular supplier for long-lived neoprene cord or write us for a list of manufacturers.

Read how this new-type portable cord can save you time and money!

As everybody knows, almost any lamp cord would last indefinitely if you coddled and pampered it. Especially cord covered with high grade rubber.

But of course you can't coddle or pamper cord around a repair shop or a service station. Here it gets kicked around and yanked around . . . yes, and dragged through grease and oil, which will rot even the best of rubber.

That's why leading suppliers of portable cord for shops and service stations are covering it with jackets made of Du Pont *neoprene* instead of rubber nowadays. For neoprene . . . while it looks and feels like rubber . . . isn't rotted by oils, grease, gasoline, or acids. (At the left you'll see how, in a recent shop test, neoprene-covered cord lasted more than *twice* as long as rubber-covered.)

Take a hint. Next time you need new cord, be sure to ask your supplier for one with a neoprene jacket. You'll be saving money with every foot you buy.

DU PONT

NEOPRENE

E. I. du Pont de Nemours & Co., Inc.
Rubber Chemicals Division
Wilmington, Delaware

Chrysler Shows Scale Models at Exposition

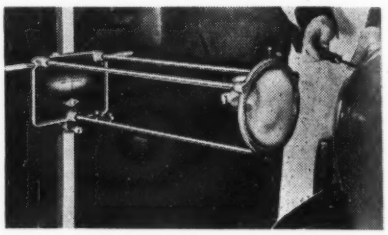
Model automobiles, each costing more to construct than the full sized car it represents, are included in the "Chrysler Serves the World" exhibit at the Golden Gate Exposition.

Scaled accurately to one-sixth actual size, the models were designed by Chrysler Corp. engineers and executed by men regularly employed in the production of life sized automobiles.

There are 11 miniature cars and one model of a 56 ft. yacht powered by a Chrysler marine engine. Each took approximately six or seven months to build. The high cost of construction came in the necessity for hand made dies to stamp the small and exact parts for each type presented. After assembly, the models complete save for an engine, were given a spray paint job.

Headlight Aiming Equipment

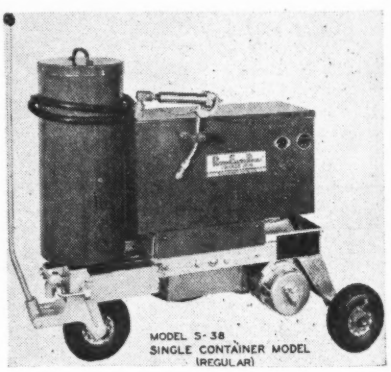
Aimed at reducing the cost of headlight aiming equipment, the Miller Tool & Mfg. Co., Inc., 1725 16th St., Detroit, Mich., has developed the tool illustrated, which carries a net price of $75. It contains all the essential features of more costly equipment, with the added advantage of being easily portable and quickly adjustable to the job. It employs a ground optical reduction lens to focus the headlight beam in reduced size on a screen that is only 30 in. from the lens, giving a clear, sharp beam pattern. The



screen is filtered, eliminating glare, which allows more accurate adjustment. Complete information regarding the new Miller Aim-O-Lite may be obtained by writing the manufacturer.

Portable Lubricating Outfit

Freedom of movement and a wide range of operation are outstanding features of the new Pressure-Lube Scooter announced a short time ago by Pressurelube, Inc., 22 East 40th St., New York City. No cords, no hose attachment, no fixtures to the wall, air tank or light socket. A real free moving lubricator with inbuilt storage battery, charger, and a motor pumping directly against the lubricant, delivering full controlled pressure requirement right to the gun nozzle—up to 12,000 lb. Set the gage for the required pressure, turn the switch, and you're ready to work. Made in single and two-container models. For complete information and prices, write the manufacturer.



New Car Washing Compound

Anything that will speed up and simplify the job of car washing is news, and the new DECO-50 cleaner is said to do just that. It is a powder, a small quantity of which is added to the bucket of water, applied to the car and then rinsed. Dries quickly and leaves no streaks. Will not injure the finish or the hands. DECO cleaning compounds are products of I. R. L., Inc., Industrial Research Laboratories, 503 Atlantic Ave., Brooklyn, N. Y. Complete information and samples will be supplied upon request.

ROAD LIGHT INCREASED 30 TO 100% WITHOUT ADDITIONAL CURRENT

Read These Startling Facts

Statistics show that 22,000 people were killed last year in NIGHT ACCIDENTS. POOR LIGHTING was a contributing factor in the majority of cases.

●

Two-thirds of all fatal accidents are at NIGHT.

●

Percentage of cars rejected for inadequate lighting at recent State inspections:

MAINE	57%
NEW HAMPSHIRE	58%
VERMONT	75%
MASSACHUSETTS	58%
PENNSYLVANIA	75%

●

Motor vehicle inspection in 15 States emphasizes the *need for Headlight Relays.*

●

Do your bit to reduce these casualties.

Hook up with this PROVEN

PROFIT BUILDER

REPAIRMEN!—Here's a real "volume" item that is steadily rolling up an amazing sales record. And it hasn't even scratched the surface! Going over big—because it's *a safe-driving necessity!*

Authorities everywhere are crusading against the frightful death toll exacted by Defective Lighting. Motorists themselves, millions of them, are crying for *more light on the road.* Night driving *must be made safe!*

And "Blue Streak" Headlight Relay *does just that!* Literally floods the road with light—up to *100% more!* Without extra "juice."

Not a current "booster"—a "waste eliminator." Cuts voltage losses caused by high resistance switch contacts and long wiring. Brings current *direct from battery*, enabling lamps to deliver *full candlepower.*

Sells at a popular price. Brings you a generous profit. Every one of your customers a live prospect.

PUT THIS "SILENT SALESMAN" TO WORK — Highly attractive 2-color merchandiser FREE. Each contains 4 Relays. Display card tells a story of compelling interest to the car owner, at a glance.

For quick returns take quick action. Send us your jobber's name if he can't supply you.

By the Makers of
THE FAMOUS "BLUE STREAK" LINE
Ignition Parts Battery Cables
Automotive Wire

STANDARD MOTOR PRODUCTS, INC.
3718 NORTHERN BLVD., LONG ISLAND CITY, N. Y.
"STANDARD" BRANCHES — Atlanta, Chicago, Cleveland, Dallas, Detroit, Kansas City, Los Angeles, San Francisco, Minneapolis, Seattle.

MOTOR STANDARD PRODUCTS

"The ABILITY to serve well is as important as the WILL to do so."

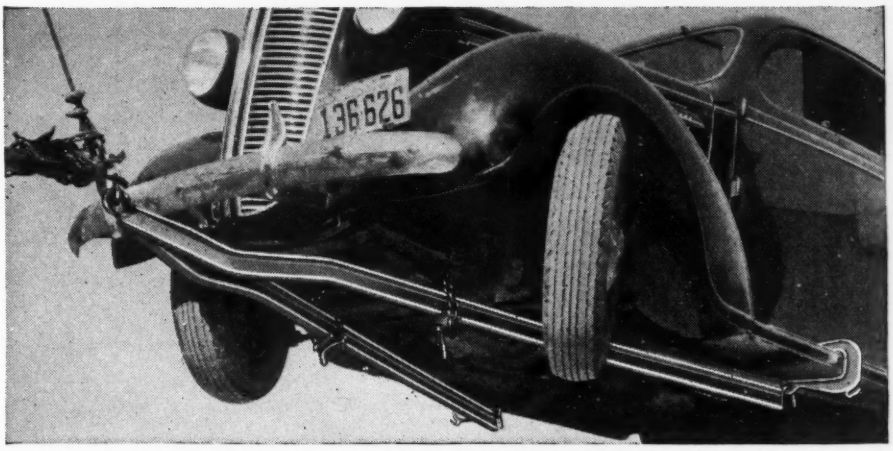
IF You Don't Think

LIFTOW ONLY $27.00

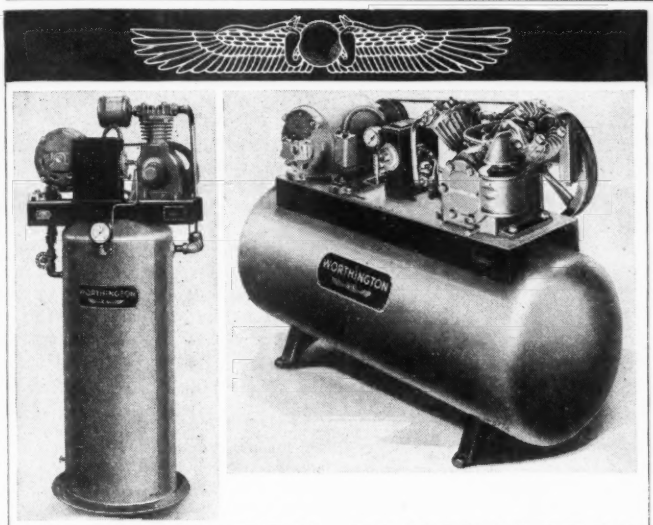
(F. O. B. PEORIA)

is EASIER . . . yes! and *quicker,* too —than any other towing device you ever used—then we will refund your money immediately after 10 days trial! You can't damage grilles, fenders or rear aprons with LIFTOW! Tows forward or backward! *Hooks up in 1 minute!*

Order direct from this ad. You can't lose with this money-back guarantee!



PARCO MFG. CO., 111 2nd AVE., PEORIA, ILLINOIS



WORTHINGTON COMPRESSORS

1.34 to 45 cu.ft. per min.

40 to 200 lb. pressure

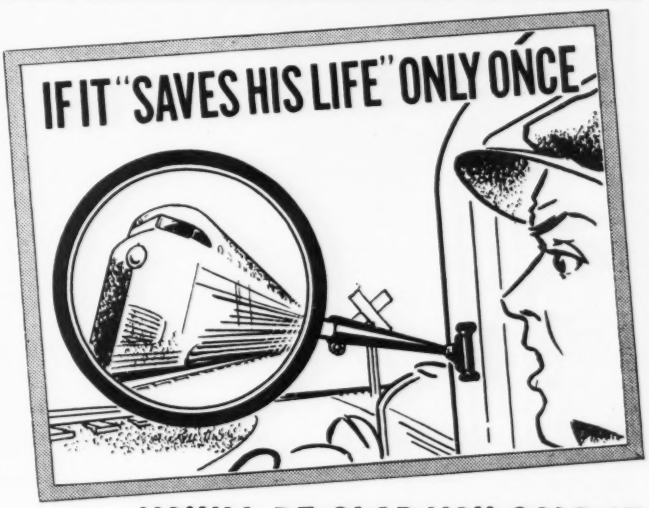
¼ to 10 horsepower

. . . are precision built for continuous heavy duty • When you install a Worthington Compressor you have placed behind your air operated equipment a thoroughly dependable, low cost, air supply • You could not find a better equipment investment.

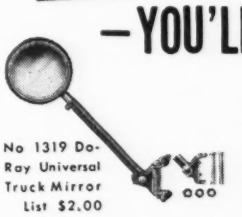
• See *the nearest Worthington Jobber or write Headquarters*

WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: HARRISON, N. J. • Offices and Jobbers in principal cities



—YOU'LL BE GLAD YOU SOLD IT



No 1319 Do-Ray Universal Truck Mirror List $2.00

Use this Do-Ray Nobby —the protected device that resists hard usage. No. 1292— List $1.00

But this Universal Truck Mirror will stand up and give safety service many times a day for years.

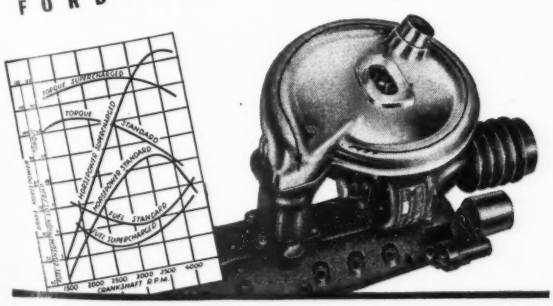
It's a sturdy piece of equipment, the kind you like to sell. Truly universal. Can be installed any place on the cab.

For safety's sake sell this mirror and the many other devices in the PROFITABLE Do-Ray line—write for information.

Do-Ray Lamp Co., 1458 South Michigan Avenue, Chicago, Ill.

DO-RAY CERTIFIED SAFETY LIGHTING AND REFLECTING DEVICES

FORD V-8
MERCURY
FORD TRUCKS



THERE'S REAL MONEY FOR YOU

SELLING *McCulloch Superchargers*

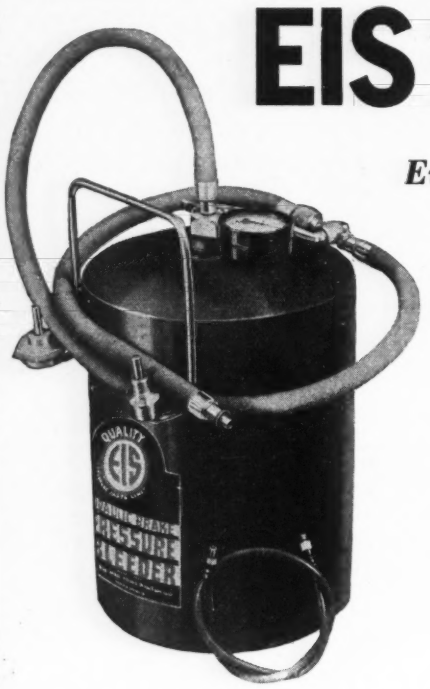
TO YOUR FORD V-8 CUSTOMERS

The swing is to supercharging! And that means unlimited profits for every McCulloch dealer! Here's why: The McCulloch Supercharger for Ford V-8 cars and trucks and Mercury cars steps up power, increases torque, assures substantial gas savings, quiet, smoother performance, livelier handling and longer engine life. Easily installed. No wonder prospects buy eagerly! Act now to cash in on nation-wide advertising. Write for franchise facts today.

McCULLOCH ENGINEERING COMPANY

3221 NORTH 31ST STREET MILWAUKEE, WISCONSIN

EIS IMPROVED HYDRAULIC BRAKE PRESSURE BLEEDER — ONLY $11.25



Every Shop Can Now Afford a Pressure Bleeder

A GREAT bleeder in every way! Meets the needs of the up-to-date brake station at nominal cost—and would still be a good buy at one-third more.

Built for long service, with characteristic Eis thoroughness. Tank of heavy steel, to withstand rough usage on floor. Safety valve. Improved "fast-connection" adaptors—a valuable time saving feature. One man does the work of two with an Eis Bleeder. Also handy for "filling."

T690—Takes care of all cars and most trucks, 1927 to 1939. Capacity 2⅛ gals. Handles up to 8 cars without refilling. Weight 14 lbs. Shop price, complete with combination Adaptors, $11.25.
T699—Combination Flushing and Bleeding Outfit. Two tanks with Fittings and Adaptors, $21.00.
T665B—3½ gallon model for larger stations, $15.00.
Extra Combination Adaptor for large trucks, 95c.

Write for full particulars on Eis Brake Fluid and "The Complete Brake Parts Line."

EIS MFG. CO. INC.
1365 Jerome Ave., New York

QUALITY EIS MFG. CO., INC. THE BRAKE PARTS LINE

Smashproof 888 Creeper Casters

Smashproof 888 casters are made by the largest manufacturer of casters in the world especially for us to our specifications, jobbers can obtain them from no other source, so states an announcement from the Hulbert Creeper Co. We have never seen any other make of creeper caster which will stand running over with a heavy car even once. Ours will stand it hundreds of times under normal conditions. These casters are by far the best value on the market for the purpose. If we spent $5.00 a set we could not buy casters which are more practical for installation on creepers.

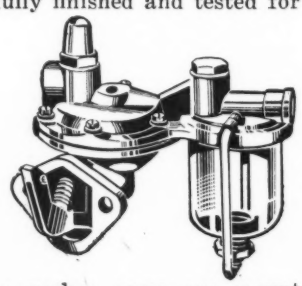
Creeper casters must swivel harder than furniture casters—our problem is exactly the opposite of the requirements for a furniture caster. A hard swiveling caster will not slide about so much under mechanics who are pulling on wrenches. Our peculiar wheel mounting which brings the wheel close under the swivel pin acts as a brake against undesirable movements of the creeper.

Creeper casters must be made to stand up under tremendous and sudden overloads without buckling or damaging the surface to which they are attached. This is due to the fact that the average creeper is run over by a car about once every two months. This means that the wheel must be mounted directly below the swivel pin and have a much heavier top-plate than ordinary casters.

Mechanics will not oil casters. We have long recognized this fact. We do not know why; we only know they do not. A creeper caster must be designed with this fact in mind. We are making Smashproof 888 casters with self-lubricating wheel bearings. The axle is equipped with a wheel spanner which more than triples its strength and entirely eliminates the possibility of axles becoming loose and turning with the wheel—a situation which quickly ruins ordinary furniture casters, such as are furnished on most makes of creepers.

Master Fuel Pumps

Several points of superiority are claimed for the new Master fuel pumps introduced by Chefford-Master Mfg. Co., Fairfield, Ill. Made for the replacement field, these pumps are equipped with AIRTEX diaphragms which are guaranteed for 50,000 miles; top and bottom castings are carefully finished and tested for sand



holes; rocker arms are mounted in proper position and close tolerances assure perfect coordination of internal parts; every pump is given an operating test before shipping. Complete information and prices may be obtained by writing the manufacturer.

N. Y. Maintenance Show Held This Month

New York's Third Annual Metropolitan Automotive Maintenance Show which is scheduled for Port Authority Building April 10 to 13 inclusive, gives every promise of going far ahead of even last year's phenomenally successful show.

The service trades have a particular and very vital interest in the show. With the New York World's Fair opening at the end of April, hundreds of thousands of cars will be brought to the New York area and a vast number of them will require service of one kind or another and the replacement of sundry parts. A realization of the great potential market represented by such a horde of tourists' cars has stimulated interest in the exhibition.

Many of the exhibits represent factories that did not exhibit last year and hence the show will hold a considerable amount of new equipment and parts that have not previously been exhibited to the trade.

As usual the show is under the management of Walter V. Hall, of the U. S. Air Compressor Co., headquarters are at Hotel Empire, New York. Executive Committee for Automotive Industries Ass'n, Inc., which sponsors the show, includes: David E. Levy, president (Lite Sales Co.); David Hertzfield, vice-president (Manley div. of American Chain & Cable Co.); Judson B. Shafter, treasurer (W. E. Pruden Co.); Walter V. Hall, secretary; Ben M. Asch (Hardie Mfg. Co.); Bart Bennett (Walters Distributing Co.); Earl G. Nisonger (Bear Mfg. Co.); Ray Horner (Van Dorn Electric Tool Co.); Wm. Van Eps (Ingersoll-Rand Co.); Abe Treitman (Amsco).

Walker "Greyhounds" New Hydraulic Jacks

Streamlined from handle to wheels are the Walker "Greyhounds"—four new hydraulic service jacks announced by the Walker Manufacturing Co., Racine, Wis. Ranging in capacity from 2 to 4 tons, this new line covers the needs of service station, maintenance shop, car dealer and fleet owner. Several new features have been incorporated, including a new relief valve, thrust-bearing casters and a new pump action. For complete details, write the manufacturer.

THE ACE SPEED GOVERNOR

Type No. 1 For All Types of Motor Vehicles

REVOLUTIONARY IN PERFORMANCE

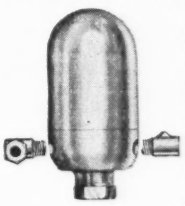
Accurate as the Speedometer itself, Co-ordinating Driver and Vehicle, and Eliminating the Human Element

WORKS WITH THE SPEEDOMETER— NOT THE ENGINE

The Ace Governor, Type No. 1, embodies the vital factor in safety that fleet owners have long awaited. Set at a predetermined speed with the speedometer, this Stewart Product permits any greater speed for a distance of from 600 to 800 ft. After this point, which is ample for safely passing another vehicle, the speed returns to that at which the governor was set.

ALLOWS ANY SPEED FOR PASSING FOR 600 TO 800 FEET

Entirely controlled by the speedometer, and not by changing gears or r.p.m., the Ace Governor gives the operator all the power of the engine for use in emergencies. Thus handicaps of hill climbing, icy or slippery roads, hard pul's under heavy loads, etc., are overcome. A warning light on the instrument panel signals the functioning of the governor.

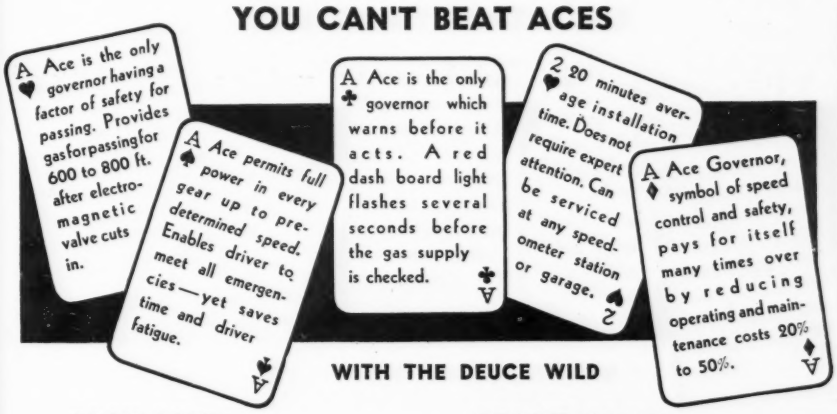


The electro-magnectic valve located in the gas line between the carburetor and the gas supply quickly cuts off and restores the gas supply at the predetermined speed.

The warning light which is attached to the instrument panel.

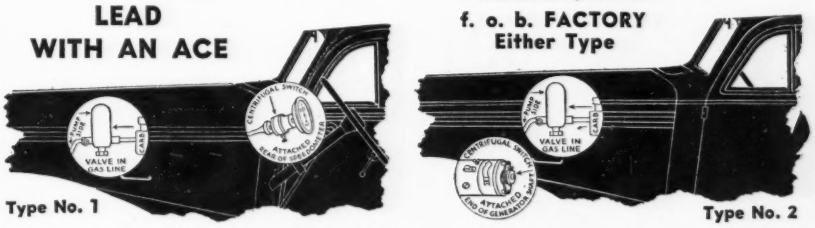
The adjustable centrifugal switch which is operated by the speedometer.

YOU CAN'T BEAT ACES


A Ace is the only governor having a factor of safety for passing. Provides gas for passing for 600 to 800 ft. after electro-magnetic valve cuts in.
A Ace permits full power in every gear up to predetermined speed. Enables driver to meet all emergencies—yet saves time and driver fatigue.
A Ace is the only governor which warns before it acts. A red dash board light flashes several seconds before the gas supply is checked.
2 20 minutes average installation time. Does not require expert attention. Can be serviced at any speedometer station or garage.
A Ace Governor, symbol of speed control and safety, pays for itself many times over by reducing operating and maintenance costs 20% to 50%.
WITH THE DEUCE WILD

PLAY SAFE LEAD WITH AN ACE

PRICE $9.75
f. o. b. FACTORY
Either Type



Type No. 1 — Type No. 2

Showing Valve and Switch in Position

FOR YOUR CUSTOMERS with Heavy Duty Vehicles

If they require R.P.M. control, The Ace Governor, Type No. 2, is generator-operated and synchronized with the motor R.P.M. at the speed required in high gear. Performance in low gears in similar ratio. Identical with Type No. 1 except that centrifugal switch fits dust cap end of generator shaft. IMPOSSIBLE FOR RECKLESS DRIVERS TO EXCESSIVELY RACE THE MOTOR. Both types standardized for most all trucks. No extra parts required. Simple instructions for installation. Call your favorite jobber or communicate with our nearest office.

Scientific Research Incorporated

TRUST BLDG., WILLIAMSPORT, PA.

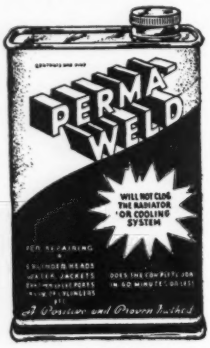
Genl. Distributors for Pa., N. Y., N. J., Del. and Md.

Manufactured and Distributed Internationally By

F. W. STEWART MFG. CO., Chicago, Ill.

HOW'S YOUR STOCK IN THE LINE OF LEAST RESISTANCE?

PERMA - WELD does a master repair job on aluminum and cast iron in 30 minutes. Welds as it flows—won't clog radiator or cooling system. For boilers and industrial use as well as automotive cylinder heads, valve parts, blocks, etc. Perma - Weld repairs permanently and dependably. Guaranteed.



PERMA-WELD

RUST-EX

RUST - EX removes radiator rust while riding. No draining nor flushing required with this "spring tonic" for cooling systems. Stops rust before it starts—dissolves all clogging dirt without harmful acids or alkalis. No labor necessary.

WATTS-WAGNER CO., INC.
119-23 West 64th St., New York, N. Y.
Consolidated Exports
1775 Broadway, New York, N. Y.

TRADE MARK
NOC-OUT HOSE CLAMPS
THE HOSE CLAMP WITH THE THUMB SCREW

Seals absolutely against leakage of anti - freeze, radiator connections, or heater hose. Type A, Adjustable, the clamp with the thumb screw, 1 size fits many. Type GHH for heater hose. Type GBB for booster brakes.

WITTEK MFG. CO.
4305 W. 24th Pl., Chicago, U.S.A.

Merger to Present New Pneumatic Lift

Two announcements of interest to the automotive industry have come from the Kellogg Compressor & Manufacturing Corp., of Rochester, N. Y. A merger of the interests of Kellogg and the American Brake Shoe & Foundry Co. has been completed. Coupled with this is the announcement that the new organization has been granted an exclusive license to manufacture and market a pneumatic lift of exclusive design.

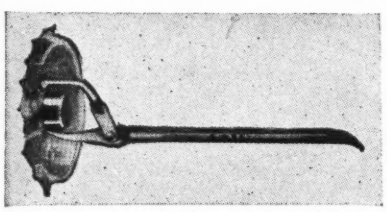
The new organization will be known as the Kellogg division of the American Brake Shoe & Foundry Co. J. F. Weller, who has been known in the automotive business for many years as president of the Kellogg company, will be president of the new division, with headquarters in Rochester, N. Y. The Kellogg policy of selective distribution through automotive jobbers will be continued in force, according to Mr. Weller.

Also associated with this new setup will be H. O. Holland, formerly sales manager of Kellogg, as well as the district managers who have previously represented Kellogg.

In addition to the lift, manufacture of the Kellogg line of air compressors and air equipment will be continued, and plans for an aggressive sales and merchandising program will be announced shortly. Sidener and Van Riper, Inc., of Indianapolis, have been retained as advertising and marketing counsel.

Removes Grease Cap

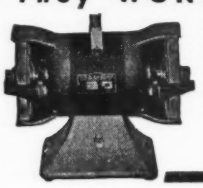
Many front wheel grease caps are too far in to be reached by ordinary prys. This new tool takes them all. One jaw rests on the ridge, the opposite loose jaw gets under the opposite side. A quick yank, and the cap



is off. And you can use the other end of the tool for prying off the outer hub cap. Price $1.35. Rinch-McIlwaine, Inc., 16 Hudson St., New York City.

BALDOR BALL BEARING GRINDERS

They WONT BURN OUT



Ruggedly built. Ball-bearing Capacitor type motor protects against burn-out. Adjustable tool rests. Guaranteed 1 year **$20.50**

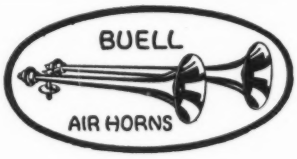
BALDOR ELECTRIC CO.
4375 Duncan Avenue
ST. LOUIS, MO.

We are telling 40,000,000 MOTORISTS:

EVEREADY PRESTONE
TRADE-MARKS
ANTI-FREEZE
Costs More by the Gallon... LESS by the Winter
WILL YOU CASH IN?

RICH

VALVES
of
Silchrome-X STEEL



Increase your driving safety as proportionately as four wheel brakes over two wheel brakes.

South Range: 1 to 10 miles
New Remote Controlled Spot Light Ready. Avoids drilling car body.

Write for literature

BUELL MANUFACTURING COMPANY
2983 Cottage Grove Ave., Chicago, Ill.

BUY AT THE SIGN OF THE LION

Your GUARANTEE of Dependable Quality

Look for the orange and black LION Trade-mark—it is your Guarantee of Dependable Quality Automotive Parts, Supplies and Accessories. Nationally advertised, Nationally Distributed, LION Dependable Quality Products give complete satisfaction to Jobbers, Dealers, and Users.

Every Automotive Need From One Reliable Source

LION AUTO PARTS & MFG. CO. Inc.
1920 S. MICHIGAN AVE. CHICAGO • 2214-16 MAIN ST. DALLAS

MOTOR AGE

—is a publication keyed directly to the needs of the maintenance field. Built on the requirements of the serviceman. Edited by Bill Toboldt. Read it every month.

A Chilton Publication

CHESTNUT AND 56TH STS.
PHILADELPHIA, PA.

- FOUND -

A tool that loosens corroded cylinder head studs in minutes - not hours. The National Hydraulic Action Tool has a hollow base which screws on stud, seating itself firmly on cylinder head. Half-fill with oil, insert plunger, strike with hammer - - and the stud is ready to turn out.

557 (3/8" - 24 thread) 75c
557A (7/16"-20 thread) 80c
557B (1/2" - 20 thread) 85c

NATIONAL MACHINE & TOOL CO.
JACKSON, MICHIGAN

Don't Pay More!

Don't Accept Less

Valley Battery Chargers quickly repay their low first cost in added profits to your shop. Guaranteed for two years.

Model G-12 charges 1 to 12 6-volt batteries.

NOW ONLY **$25.00**

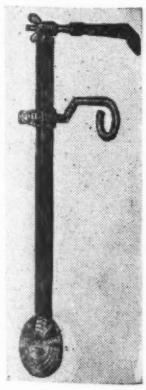
Other sizes at equally low prices. Write for FREE bulletin.

Valley Electric Corp.
4221 Forest Park Blvd. • St. Louis, Mo.

"King" Announces New Electric Tachometer

If you want to get the most out of your engine tune-up jobs, the new "King" Electro-Tach or R. P. M. Indicator will help you. This new piece of equipment by The Electric Heat Control Co., 9123 Inman Ave., Cleveland, Ohio, simplifies timing the ignition, adjusting the carburetor, setting the governor, voltage regulator and cutout. It is connected by grounding one wire and attaching the other by a clip to the primary post of the coil or distributor. Requires no balancing or disconnecting of wires. When proper tune-up has been made it indicates increased R.P.M.

Door Handle Bezel Depressor



Here's a tool that does a mean job easily and quickly — makes it possible to remove the remote control door handle and window regulator handle retaining pin or wire, using both hands. Clamp at the top of the tool rests on the reveal moulding, while the other clamp, adjustable to any height, fits around the handle to be removed. A light pressure of the knee forces the bezel against the trim panel, uncovering the retaining pin or wire so that it can be easily removed, or installed. Price $1.25. Rick-McIlwaine, Inc., 16 Hudson St., New York City.

Lubrication by Degrees

Latest piece of equipment for service stations is a thermometer.

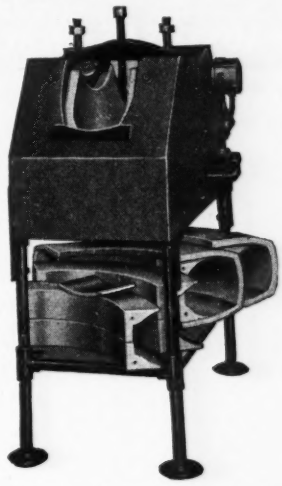
It seems that lubricating motor vehicles in fickle weather, with the temperature indicating summer one hour and mid-winter a bit later, isn't so easy. So a technique has been devised whereby, with a thermometer, a chart, and some scientifically-matched lubricants, the vehicle can be given a thorough and satisfactory job under any conditions, and just the right oil put into the crankcase.

The service station operator's "weather lubricant chart" divides the thermometer into lubricant temperature ranges. Once the range is known, the proper lubricants are ready.

Manufacturing the lubricants was not so difficult, but when it came to dividing the thermometer into hot, cold, and normal ranges, controversies arose. Agreement finally produced five "seasons" ranging from "extreme cold," which is below 10 degrees below zero, to "very hot," which is 90 degrees above zero, and over.

The motorist doesn't have to worry about it, because the whole scheme now is simplified and automatic—and the vehicle is lubricated exactly according to the weather.

We lobby for our Hobby. Precision Accuracy and economy of operation.



The above mold for steam line without insulation, will be made and guaranteed for a nominal sum, for **550-600-16 tires or 600-650-16-17 tires.** Write for full particulars.

CHASE MFG. CO.
3216 Delmar Blvd. St. Louis, Mo.

DURO "VAC-LOK-GRIP"

Now you can safely handle those "Tricky" Jobs . . . . . .

USE VAC-LOK-GRIP FOR

• REMOVING HEADLIGHT LENS
• REPLACING WINDOW GLASS
• REMOVING HUB CAPS

The lever draws the suction disc into the heavy metal shell, permanently locking the tool to any smooth surface. So strong is its grip that you can actually lift 40 pounds dead weight. It takes all the awkwardness out of setting glass in doors and windshields, as well as preventing accidents. Ideal for pulling out soft dents in bodies; removing head light lens, hub caps, etc. Acclaimed by service stations, garages, and mechanics as the only 100% satisfactory tool for the job that they ever used. A time saver and accident preventer. Get one now from your dealer. Price $1.00. Write for 116 page free catalog No. 39M.

DURO METAL PRODUCTS CO.
2649 N. KILDARE AVE.—DEPT. MA-2
CHICAGO, ILL.

"WHEN IT'S MADE BY DURO IT'S RIGHT"

LOOK WHAT THE "KING" 200 TESTER with EXHAUST GAS ANALYZER has to offer You

The "KING" MT-200 WITH EXHAUST GAS ANALYZER $240.00

SOLD ON DEFERRED PAYMENTS

The "KING System" of Motor Tune-up is increasing business in shops everywhere because car owners just naturally go where they get the best service. To give high-grade service it is necessary to have tune-up equipment in order to properly locate trouble in high-speed motors. The "KING" MT-200 with Exhaust Gas Analyzer will bring your shop up to date without a big outlay of cash and will soon pay for itself. Among others it will make the following tests: Exhaust Gas, Coils, Relays, Generators, Fuel Pump, Carburetors, Ignition, Spark Plugs, Condensers, Cutouts, Voltage Regulators, Timing, Ground, Continuity, Cables, etc. You can test coils on or off the car with or without engine running.

Here is the NEW R.P.M. Meter and Exhaust Gas Analyzer

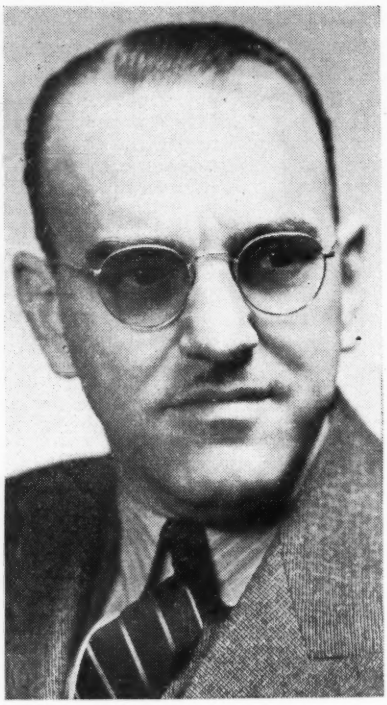
The combination R. P. M. and Exhaust Gas Analyzer Unit simplifies timing of ignition, carburetor adjusting, setting governor, voltage regulator, and cut-outs. By turning a switch it is automatically converted into a quick-acting Exhaust Gas Analyzer. This combination unit (illustrated) sells for $80.00 complete. Can supply a smaller Electro-Tach for $37.50 and a companion Exhaust Gas Analyzer for $34.00, both with hangers.

NEW BATTERY TESTER

The 8½" meter will show tests on all cells combined. Then EACH cell rating can be taken. Makes comparison readings on 11 to 21-plate batteries. The meter dial is calibrated, and figures are easily read. You get accurate readings on complete batteries and individual cells. Price $48.50 complete.

Ask your Jobber or Write us Jobber's Name

The ELECTRIC HEAT CONTROL Co.
9123 INMAN AVE. CLEVELAND, OHIO
KING-Good Products Since 1914-KING



HARVEY J. NESTLE

. . . who has been appointed general service manager of the Chrysler Corp. Central Service Division to succeed T. W. Moss who has been made Director of Truck Sales for the Dodge Division. Mr. Nestle has been assistant manager of Central Service since this unit was first established in November, 1935.

N.S.P.A. Appoints A.S.I. Show Representatives

Appointed by President L. G. Matthews and approved by the National Standard Parts Association board of directors during its recent meeting in Detroit, the following members of the association will serve as its representatives on the Joint Operating Committee for the next Automotive Service Industries Show: S. J. Levy, W. Bergman Co., Inc.; R. L. Terry, United Wholesalers; C. C. Bradford, Eaton Products, Inc.; Franklin A. Miller, United States Asbestos division of Raybestos-Manhattan, Inc.

"We usually fix them on the vulcanizer, but in your case perhaps I can stretch a point and fix it on you!"

In 15 minutes—you can make $2.00 resilvering headlight reflectors with

SURE-PLATE!

•

SURE-WELD

It takes 30 minutes to permanently seal cracks in aluminum and cast-iron blocks and heads!

•

No more draining or flushing worries with

KLEERUST

•

SURE-RITE PRODUCTS CORP.
6010 N. Camac St., Phila., Pa.

AUTO PAINTERS AND APPRENTICES

Send us your name and address on a postcard to obtain, without obligation, a big, free pamphlet on how to make extra dollars for you.

WENDELL MANUFACTURING CO.
2533 No. Ashland Ave., Chicago, Ill.
Manufacturers of Painter's Striping Equipment

FAST-MOVING MONEY MAKER

NEW NOVEL CRYSTAL KEY CHAIN

Genuine Catalin with third dimension subject crystal insert of Scotties, Horse Head, Sail Boat, Sail Fish, Hurdler and Wire Hair. Available in natural onyx, beige, Brazil onyx, Morocco red and mottled gray. 24 on an attractive 3-color display card or individual card. Write today for details.

SINKO TOOL & MFG. CO.
351 N. Crawford Ave.
CHICAGO, ILL.

NEW LOW PRICE
20¢ Each
LIBERAL DISCOUNTS

FREE

wall chart giving complete Motor Tune-up data for all Carter equipped cars.

CARTER
CARBURETOR CORPORATION
2820-56 N. Spring Ave., St. Louis

WHERE in Hades is that fitting?

STOP your time-wasting, hair-tearing search for fittings. Get a Weatherhead four drawer, 80 compartment fitting cabinet that contains complete assortments of tube fittings, *when* and *where* you want them.

THREE ASSORTMENTS

F-91	F-92	F-93
114 fittings	199 fittings	226 fittings

● Every fitting is a genuine Weatherhead fitting. Weatherhead knows which fitting to furnish because 90% of all automobiles use Weatherhead.
Your jobber has cabinet and fittings priced in a special deal that includes the cabinet and your selection of any one of the three fitting assortments for less than you ordinarily pay for the fittings alone. Ask him!

THE WEATHERHEAD CO.
Cleveland, Ohio

Weatherhead
FITTINGS • FUEL LINES • BRAKE PARTS
HYDROMETERS • DASH CONTROLS

"Own" a Car By Week or Month

Automobile ownership without capital investment in a car, is being offered doctors, salesmen and other professional people by Carservice, Inc., Long Island City, New York.

The customer picks any make of car. A contract is drawn up providing:

1. Complete service, including garaging, fueling and oiling and greasing; insurance on any basis wanted by the customer; constant preventive maintenance and daily washing; and delivery in the morning to the customer's home and calling for the car at night.
2. A new car is always available in case of an accident, guaranteeing continuous, uninterrupted service.
3. The whole plan is worked out in advance, and the customer pays for his *de luxe* service by the week or month.

In essence, the Carservice plan is similar to the rental services for trucks, and was born of 20 years' experience as a car and truck salesman in the mind of J. A. Herwitz.

Three garages inaugurated the service on April 1. The response to preliminary merchandising of the idea has been gratifying. Selected lists of physicians and salesmen were made up, and these prospects were written about the plan. Ten per cent of about 800 physicians wanted to know more about the plan, and most of these have signed up for the service. Several of the deals involve buying the prospect's present car, and crediting his account with the agreed price.

Short newspaper items have stirred up considerable interest as far north as Boston and throughout Connecticut and northern New Jersey. Four salesmen are kept busy explaining the details of the plan to inquirers.

Sales have been made on the points of no investment, no worry, and no responsibility.

There can be no fixed price for the service, because each prospective customer has specific requirements. The price depends upon the car itself, and whatever additional services are wanted. But on a weekly or monthly payment schedule, the cost of driving a brand new car always kept in the best mechanical condition, always starting the day with a full tank of gasoline is attractive.

The office of Carservice is in the Surrey Motors Corp. Officers of this Buick dealership are connected with the project, and the ability of the service to buy new models at less than delivered prices and to garage and maintain the fleet at this establishment and its two branch garages, stands the service in good stead.

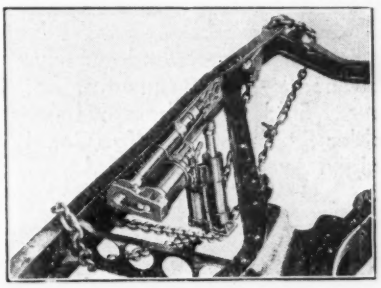
Although Surrey Motors is a Buick dealership, any make or model of automobile can be contracted for.

Initial interest in the plan has induced Mr. Herwitz to look for accessible garage facilities in Manhattan and other boroughs of New York, from where inquiries have already been received.

The service costs no more, Mr. Herwitz estimates, than the whole cost of buying a car, garaging it, and keeping it in good condition as far as the customer is concerned.

GAC

PERFECTION
POWER PLUS
HYDRAULIC JACK



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Perfection POWER PLUS Hydraulic Jack makes short work of frames which have dropped at the point where the X joins the channel by laying in the channel and extending the frame to its original position.

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WONDERWELD
Seals Engine Cracks Permanently

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Seal engine cracks permanently. Use Wonder-Weld. It gives a metallic seal that holds. That's the real difference in Wonder-Weld. This scientific formula combines three liquids and five solids. Repairs water leaks due to inside cylinder cracks—cracked valve ports, water jackets and aluminum or iron heads—in 30 minutes, not 30 hours. Sold by jobbers everywhere. Folder FREE! Miller Mfg. Co., 1220 Kaighn Ave., Camden, N. J.

Flannel's the Fashion For Race Officials

Spring fashions for automobile racing officials have been approved by the American Automobile Association's Contest Board.

Flannels will predominate and white sweaters will come into their own as "the thing" to wear at the speed events offered this summer. Grey, blue and white will be the color combination.

It is the first season in the AAA Contest Board's 34-year history that standard wearing apparel has been adopted for all events sanctioned throughout the United States. Some years back, when the famous Ascot Speedway in Los Angeles, Cal., held a prominent place in the racing spotlight, Art Pillsbury, regional director of the AAA competitive events, "dressed up" his staff of officials for the first time.

When you see the AAA officials appear at their races this year, here's what they'll be wearing:

Trousers—Grey flannel with pleated waist of sport design.

Cap—Grey flannel to match the trousers.

Sweater—White, with dark blue neckband and blue cuffs at bottom of the sweater and at bottom of the sleeves; dark blue AAA emblem of felt sewn in center of lower left-hand quarter of the sweater front.

Shirt—White.

Tie—Dark blue four-in-hand; not bow tie.

Shoes—Black.

Recognizing that cool weather has set officials and fans shivering in many seasons, the AAA has instructed its staff to be equipped with a suitable sport coat or ordinary blue coat.

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High tensile strength, quick-acting flux and uniform high quality combine to make possible the faster, cleaner work which has given Gardiner Flux-Filled Solders their high standing in the automotive industry. Modern production methods, exclusive with Gardiner, permit prices lower than you pay for even ordinary solder. Line includes Solid Wire, Bar and Body Solders . . . also Permanent Lining Babbitt Metal.

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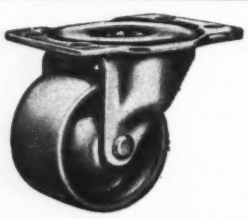

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Made for HULBERT'S *Smash-Proof* Creepers, but will fit most brands. 1¾" iron wheels—1 1/16" wide—over-all height 2¼". Equipped with thread guards and wheel spanner bushings. Permanently oiled axles.

HULBERT CREEPER CO., ASHTABULA, OHIO

Filtered Oil

Oil filtered "Nature's Way" through Chemistone is cleansed of injurious particles as microscopic as four ten-thousandths of an inch, according to Klemm Automotive Products Co., 1718 North Damen Ave., Chicago, Ill., makers of the new Klemm Filtrator. After passing through the Chemistone filtering element, the oil passes through several inches of Transluscite which removes the last vestige of stain or "smoke" and returns the oil to the crankcase clean and clear. Cartridge is replaceable by simply removing the top of the container—no tools required.

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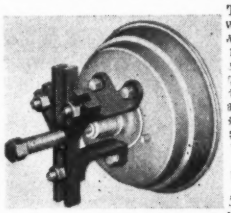

The Springfield 500 will pull frozen wheels—rusted gears, hubs and bearings, etc., easily and quickly. This puller meets with instant approval with modern service stations and garages. Delivered complete with nothing else to buy for only $7.50. Fits all 929-39 cars. Order from your jobber or write direct.

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Unbreakable chrome case — bullseye lens—guaranteed indefinitely against defective material and workmanship.

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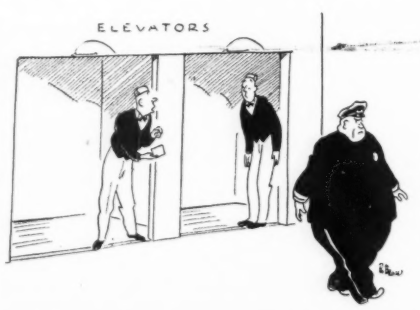

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